## APPENDIX F

# SYSTEM SIMULATION COMPUTER RUNS

Volume II

DESTRIBUTION STATEMENT &

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#### DEPARTMENT OF THE ARMY

CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS P.O. BOX 9005 CHAMPAIGN, ILLINOIS 61826-9005

REPLY TO ATTENTION OF:

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17 Sep 1997

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Marie Wakeffeld, Librarian Engineering

Building 034
Trace Input File

19971017 185

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       01/DEPARTMENT OF THE ARMY
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       08/CARLISLE
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  11
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       20/4/2/KITCHEN/187/1/1/0//10
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 82
       20/5/3/DINING ROOM/204/1/1/0//10
 83
       20/6/4/BATH/50/1/1/0//10
 84
      20/7/5/BEDROOM NO. 1/194/1/1/0//10
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      20/8/5/LIVING ROOM/189/1/1/0//10
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      20/9/6/VEST & CLOSET/41/1/1/0//10
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105
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106
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108
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110
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112
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118
       29/3/////.23/CFM-SF
       29/4/////.23/CFM-SF
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       29/5/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
       29/6/////.23/CFM-SF
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       29/7/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
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127
       40/1/PTAC
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       41/1/1/3/3/5/5
129
       42/1/.25
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131
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      65/1/1//2/2
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       69/1/EQ4003
```

Building 034

Trace Output File

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 34

Weather File Code: CARLISLE Location: ENERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (deg) Longitude: 77.2 (deg) 5 Time Zone: 475 (ft) Elevation: 29.2 (in. Hg) Barometric Pressure: Summer Clearness Number: 1.00 1.00 Winter Clearness Number: Summer Design Dry Bulb: 92 (F) Summer Design Wet Bulb: 72 (F) (F) Winter Design Dry Bulb: 4 0.20 Summer Ground Relectance: Winter Ground Relectance: 0.20 Air Density: 0.0742 (Lbm/cuft) Air Specific Heat: 0.2444 (8tu/lbm/F) Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft) Enthalpy Factor: 4.4519 (Lb-min./hr/cuft) Design Simulation Period: May To September System Simulation Period: January To December Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 11

11:28: 8 1/10/94

Dataset Name:

CB34 .TM

AIRFLOW - ALTERNATIVE 1 BASE BUILDING

----- S Y S T E M S U M M A R Y ------ (Design Airflow Quantities)

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	PTAC	99	986	986	1,264	376	0	0
2	RAD	0	0	0	0	388	0	0
Totals		99	986	986	1,264	764	0	0

CAPACITY - ALTERNATIVE 1
BASE BUILDING

(Design Capacity Quantities)

System Syste	m Capacity	Aux. Sys.	Opt. Vent Capacity		Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (8tuh)	Heating Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1 PTAC 2 RAD Totals	2.2 0.0 2.2	0.0	0.0 0.0 0.0	2.2 0.0 2.2	-30,553 -42,933 -73,485	0 0 0	0 0 0	0 0 0	0 0 0	· 0	-30,553 -42,933 -73,485

The building peaked at hour 16 month 7 with a capacity of 2.2 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

į			Percent		Cool	ing		Heat	ing	
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ · Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft
1	Main	PTAC	10.00	1.12	449.1	399.3	30.05	1.12	-34.84	877
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-32.40	1,325

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

******	*******	****** C	OOLING COIL	PEAK ****	********	******				***** HEATI		
Peaked a	t Time ==:		Mo/Hr:					•	7/17 *		Mo/Hr: 13/	1
Outside	Air ==>	0A	DB/WB/HR: '	91/ 73/ 98.	0		* (	DAD8:	89 *		OADB: 4	
		Space	Dat Air	Ret. Air	Not	Percnt	*	Space	Percnt *	Space Peak	Coil Pe	ak Percnt
	9,	opace ens.+Lat.	Sensible	Latent	Total			sible	Of Tot *	Space Sens		
Envelope		(Btuh)	(Btuh)	(Btuh)	(Btuh)	4		Btuh)	(%) *	(Btuh)		
Skylit		(66411)	(0,411)	(ocuii)	(00011)	0.00	-	0	0.00 *	(50011)		0.00
Skylit		0	0		0		*	0	0.00 *	0		0 0.00
Roof C		0	0		0	0.00		0	0.00 *	Č		0 0.00
Glass		5,165	0		5,165			6,791	39.11 *	ď		0 0.00
Glass		1,147	0		1,147	4.35		885	5.10 *	-5,483		
Wall C		3,986	0		3,986	15.12		4,702	27.08 *	-5,764		
Partit		3,700	V		0,700	0.00		0	0.00 *	3,70		0 0.00
	d Floor	0			0	0.00		0	0.00 *	0		0.00
Infilt		10,279			10,279	39.00		3,655	21.05 *	-19,306		
Sub To		20,578	0		20,578	78.07		5,032	92.33 *	-30,553		
Internal		20,370	V		40,370	10.01	*	5,052	/2.00 *	00,550	30,3	30 100.00
Lights		1 107	0		1,193	4.53		1,004	5.78 *	0		0 0.00
-		1,193 744	V		744	2.82		327	1.88 *	0		0 0.00
People Misc		0	0	0	0	0.00		0	0.00 *	0		0 0.00
Sub To	+-1>	1,937	0	0	1,937	7.35		1,331	7.67 *	0		0 0.00
Ceiling		1,737	0	V	1,737	0.00		0	0.00 *	Ů		0 0.00
Outside		0	0	0	3,632	13.78		0	0.00 *	0		0 0.00
Sup. Fan		V	V	V	210		*	v	0.00 *	·		0 0.00
			0		. 0	0.00			0.00 *			0 0.00
Ret. Fan Duct Hea			0		0	0.00			0.00 *			0 0.00
OV/UNDR		0	V		0		*	0	0.00 *	0		0 0.00
Exhaust	_	V	0	0	0		*	V	0.00 *	V		0 0.00
Terminal			0	0	0		*		0.00 *			0 0.00
101 HITHOI	oypass		V			V.VV	*		*			0.00
Grand To	tal==>	22,514	0	. 0	26,357	100.00	* 17	7,363	100.00 *	-30,553	-30,5	53 100.00
				_ii								
	T-4-3 0			ING COIL S			in la			Gross Total	AREAS	(cf) (\$)
		Capacity	Sens Cap.			ng DB/WB/F		_	DB/WB/HR			(sf) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)		F Grain	-	-	F Grains	Floor	877	
Main Clg	2.2	26.4	18.3	986						Part	0	
Aux Clg	0.0	0.0	0.0	0		).0 0.		0.0		Exflr	0	Λ Λ
Opt Vent	0.0	0.0	0.0	0	0.0	.0 . 0.	0.0	0.0	0.0	Roof	0 990	0 0 102 10
Totals	2.2	26.4							i	Wall	770	102 10
	HEATING	COIL SEL	ECTION		AIR	RFLOWS (cf	m)		-ENGINEERING	CHECKS	TEMPERAT	JRES (F)
	Capacity	Coil A	irfl Ent	Lvg	Type	Cooling	Heating	C	lg % OA	10.0	Type	Clg Htg
	(Mbh)	(cfi	n) Deg F	Deg F	Vent	99	(	) C]	lg Cfm/Sqft	1.12	SADB	58.8 96.5
Main Htg	-30.6	}	986 68.0	96.5	Infil	277	277	7 C	lg Cfm/Ton	449.12	Plenum	75.0 68.0
Aux Htg	0.0	)	0.0	0.0	Supply	986	986	5 C	lg Sqft/Ton			75.0 68.0
Preheat	-0.0	)	986 62.4	58.6	Mincfm	0	(	) C	lg Btuh/Sqft	30.05	Ret/OA	76.5 68.0
Reheat	0.0		0.0	0.0	Return	986	986	s No	o. People	2	Runarnd	75.0 68.0
Humidif	0.0		0.0	0.0	Exhaust	99	(	) H	tg % OA	0.0	Fn MtrTD	0.0 0.0
Opt Vent	0.0	)	0.0	0.0	Rm Exh	0	(	) H1	tg Cfm/SqFt	1.12	Fn BldTD	0.0 0.0
Total	-30.6				Auxil	0	(	) H1	tg Btuh/SqFt	-34.84	Fn Frict	0.1 0.0

System 2 Block RAD - RADIATION

******	******	****** C	OOLING COIL		******	******	****				***** HE			******
Peaked at	t Time ==>		Mo/Hr:				*			0/0 *		Mo/Hr: 1	3/ 1	
Outside A	ir ==>	0A	DB/WB/HR:	0/ 0/ 0.	0		*	0:	ADB:	0 *		OADB:	4	
		Space	Ret. Air	Ret. Air	Net	Percn	t *	S	pace	Percnt *	Space P	eak Coil	Peak	Percnt
	Se	ens.+Lat.	Sensible	Latent	Total	Of To	t *	Sens	ible	Of Tot *	Space S	ens Tot	Sens	Of Tot
Envelope		(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%	) *	(8	tuh)	(%) *	(Bt	uh) (8	ituh)	(%)
Skylite		Ò	, 0	, ,	Ò	0.0	) *		0	0.00 *		0	0	0.00
Skylite		0	0		0	0.0	) *		0	0.00 *		0	0	0.00
Roof Co		0	0		0	0.0	) *		0	0.00 *	-	192	-192	0.45
Glass S		0	0		0	0.0	) *		0	0.00 *		0	0	0.00
Glass C		0	0		0	0.0	) *		0	0.00 *	-7,	639 -7	,639	17.79
₩all Co		0	0		0				0	0.00 *	-8,		,074	18.81
Partiti		0			0				0	0.00 *	,	0	0	0.00
Exposed		0			0		) *		0	0.00 *		0	0	0.00
Infiltr		0			0		) *		0	0.00 *	-27,	028 -27	,028	62.95
Sub Tot		0	0	•	0		) *		0	0.00 *	-42,		,933	100.00
Internal		•	•		•	•••	*		·	*	,		,	_
Lights	20003	0	0		0	0.0	) *		0	0.00 *		0	0	0.00
People		0	V		0				0	0.00 *		0	0	0.00
Misc		0	0	0	0		) *		0	0.00 *		0	0	0.00
Sub   Tot	1	0	0	0	0				0	0.00 *		0	0	0.00
Ceiling L		۸	0	V	0		) *		0	0.00 *		0	0	0.00
Outside A		0	0	0	0				0	0.00 *		0	0	0.00
Sup. Fan		V	V	V	0		) *		٧	0.00 *		V	0	0.00
· ·			0		. 0					0.00 *			0	0.00
Ret. Fan Duct Heat			0		. 0		) *			0.00 *			0	0.00
OV/UNDR S		0	V		0				0	0.00 *		0	0	0.00
Exhaust H	-	V	0	0	0				V	0.00 *		V	0	0.00
Terminal			0	0	0					0.00 *			0	0.00
10111111111	uypass		V	V	V	V.V.	*			*			•	
Grand Tot	al==>	0	0	. 0	0	0.0	*		0	0.00 *	-42,	933 -42	,933	100.00
			coo	LING COIL S	ELECTION							AREAS-		
:	Total C	apacity		Coil Airfl		ng DB/W	3/HR	Leav	ving D	B/WB/HR	Gross To	tal Gla	ss (st	f) (%)
I	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De			Deg F	Deg F	Grains	Floor	1,325		
Main Clg	0.0	0.0	0.0	0		0.0	0.0	0.0	0.0	0.0	Part	0		
Aux Clg	0.0	0.0	0.0	0		0.0	0.0	0.0	0.0	0.0	ExFlr	0		
	0.0	0.0	0.0	0		0.0		0.0	0.0		Roof	41		0 0
Totals	0.0	0.0		·		,					Wall	1,386	1	142 10
	HEATING	COIL SEL	ECTION		AI	RFLOWS	(cfm)			ENGINEERING	CHECKS	TEMPER	ATURES	S (F)
			irfl Ent					Heating	ስ1.	g % OA	0.0	Type	Clg	Htg
	(Mbh)					(	)	0	Cl	g Cfm/Sqft	0.00	SADB	0.0	68.1
Main Htg	-42.9	)	0 0.0		Infil	(	)	388 0	Cl	g Cfm/Sqft g Cfm/Ton g Sqft/Ton	0.00	Plenum	0.0	68.0
Aux Htg	0.0	)	0 0.0		Supply	(	)	. 0	Cl	g Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0	)	0 0.0		Mincfm	(	)	0	Cl	g Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Reheat	0.0		0 0.0		Return		)	0		. People	0	Runarnd	0.0	68.0
Humidif	0.0		0 0.0		Exhaust		)	0	Ht	g % OA	0.0	Fn MtrT(		
Opt Vent	0.0		0 0.0		Rm Exh		)	0	Ht	g Cfm/SqFt	0.00	Fn BldT(		
Total	-42.9			-	Auxil						-32.40	Fn Frict		

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

							ues				Room	Room
_					,	/hr/sqf		W2			Mass	Capac.
Room				Summr	Wintr		Summr	Wintr		0.23	(1b/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	DEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.92
2	UTILITY ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	13.3	5.31
Zone	<ol> <li>Total/Ave.</li> </ol>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	12.3	5.09
5	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
7	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.5	4.69
8	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.90
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.0	4.80
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.8	4.75
1	DEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.92
2	UTILITY ROCM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	13.3	5.31
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	12.3	5.09
3	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.0	4.56
4	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.7	4.28
<i>I</i> on <b>e</b>	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	9.3	4.41
5	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
Ione	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
6	BATH	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.1	4.59
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.1	4.59
7	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.5	4.69
8	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.90
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.0	4.80
9	VEST & CLOSET	0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	19.5	6.88
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	19.5	6.88
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	10.6	4.72
Buildin	g	0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	10.7	4.73

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

----- BUILDING AREAS ------

		Numbi	er of	Floor Area/Dupl	Total Floor	Partition	Exposed Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room			icate	Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	DEN	1	1	165	165	0	0	0	0	0	27	12	193
2	UTILITY ROOM	1	1	125	125	0	0	0	0	0	9	4	193
Zone	1 Total/Ave.				290	0	0	0	0	0	36	9	387
5	DINING ROOM	1	1	204	204	0	0	0	0	0	25	20	97
Zone	3 Total/Ave.				204	0	0	0	0	0	25	20	97
7	BEDROOM NO. 1	1	1	194	194	0	0	0	0	0	. 12	6	186
8	LIVING ROOM	1	1	189	189	0	0	0	0	0	29	12	219
Zone	5 Total/Ave.				383	0	0	0	0	0	41	9	404
System	1 Total/Ave.				877	0	0	0	0	0	102	10	888
1	DEN	1	1	165	165	0	0	0	0	0	27	12	193
2	UTILITY ROOM	1	1	125	125	0	0	0	0	0	9	4	193
Zone	<pre>1 Total/Ave.</pre>				290	0	0	0	0	0	36	9	387
3	BEDROOM NO. 2	1	1	170	170	0	0	0	0	0	12	8	141
4	KITCHEN	1	1	187	187	0	0	0	0	0	8	7	105
Zone	2 Total/Ave.				357	0	0	0	0	0	20	8	246
5	DINING ROOM	1	1	204	204	0	0	0	0	0	· 25	20	97
Zone 📒	3 Total/Ave.				204	0	0	0	0	0	25	20	97
6	BATH	1	1	50	50	0	0	0	0	0	7	14	43
Zone i	4 Total/Ave.				50	0	0	0	0	0	7	14	43
Ż	BEDROOM NO. 1	1	1	194	194	0	0	0	0	0	12	6	186
8	LIVING ROOM	1	1	189	189	0	0	0	0	0	29	12	219
Zone	5 Total/Ave.			•	383	0	0	0	0	0	41	9	404
9	VEST & CLOSET	1	1	41.	41	0	0	0	0	41	14	17	68
Zone <sup>?</sup>	6 Total/Ave.	=	=	•	41	0	0	0	0	41	14	17	68
System	2 Total/Ave.				1,325	0	0	0	0	41	142	10	1,244
Buildin	,				2,202	0	0	0	0	41	245	10	2,131

ASHRAE 90 ANALYSIS - ALTERNATIVE 1 BASE BUILDING

----- A S H R A E 9 O A N A L Y S I S -----

Overall Roof U-Value = 0.073 (Btu/Hr/Sq Ft/F) Overall Wall U-Value = 0.174 (Btu/Hr/Sq Ft/F) Overall Building U-Value = 0.173 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 5.54 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 14.04 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

#### System Totals

Percent	Cool	ing Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design Load	Cap. (Ton)		Hours	Capacity (Btuh)	Hours (%)		Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
Luau	(1011)	(*)		(00011)	(0)		(01111)	(*)		(01111)	(-0)	
0 - 5	0.1	25	316	-3,674	14	670	49.3	0	0	0.0	0	0
5 - 10	0.2	11	141	-7,349	13	634	98.6	0	0	0.0	0	0
10 - 15	0.3	7	92	-11,023	16	804	148.0	0	0	0.0	0	0
15 - 20	0.4	8	101	-14,697	20	964	197.3	42	1,530	0.0	0	0
20 - 25	0.5	4	56	-18,371	18	875	246.6	0	0	0.0	0	0
25 - 30	0.7	10	120	-22,046	12	606	295.9	0	0	0.0	0	0
30 - 35	0.8	3	42	-25,720	7	338	345.3	0	0	0.0	0	0
35 - 40	0.9	7	88	-29,394	0	0	394.6	0	0	0.0	0	0
40 - 45	1.0	8	103	-33,068	0	0	443.9	0	0	0.0	0	0
4550	1.1	5	65	-36,743	0	0	493.2	21	765	0.0	0	0
50 -  55	1.2	3	42	-40,417	0	0	542.5	0	0	0.0	0	0
55 - 60	1.3	4	51	-44,091	0	0	591.9	0	0	0.0	0	0
60 - 165	1.4	0	0	-47,766	0	0	641.2	0	0	0.0	0	0
65 - 70	1.5	0	0	-51,440	0	0	690.5	0	0	0.0	0	0
70 - 75	1.6	0	0	-55,114	0 -	0	739.8	0	0	0.0	. 0	0
75 - 80	1.8	2	20	-58,788	0	0	789.2	0	0	0.0	0	0
80 - 85	1.9	1	11	-62,463	0	0	838.5	0	0	0.0	0	0
85 - 90	2.0	0	0	-66,137	0	0	887.8	0	0	0.0	0	0
90 - 95	2.1	0	0	-69,811	0	0	937.1	0	0	0.0	0	0
95 - 100	2.2	0	0	-73,485	. 0	0	986.4	38	1,377	0.0	0	0
Hours Off	0.0	0	7,512	0	0	3,869	0.0	0	5,088	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
BASE BUILDING

****					BUI	LDI	N G	TEM	PERA	ATURE PROFILES
Temperature Range (F)	1	3	5	1	<u>-</u> 2	3		 5		one Number
Max. Temp. Mo./Hr. Day Type	81.9 7 14 1	79.0 7 14 1	83.1 7 14 1	105.4 8 20	105.8 8 21 1	107.5 7 22 1	110.1 8 18 1	102.6 7 21 1	104.1 7 19 1	
						,			Num	ber of Hours
Above 100	0	0	0	256	1,206	1,030	1,500	120	0	
95 - 100	0	0	0	1,117	1,249	950	1,040	919	208	
90 - 95	0	0		1,107				1,057	687	
85 - 90	0	0				706				
80 - 85	0	0	0	470	428	493	90	808	796	
75 - 80	2,174	2,817	2,319	0	0	0	0	35	704	
70 - 75	1,009	855	1,002	217	51	109	304	0	300	
65 - 70	765	102	351	4,871	5,037	4,979	4,784	5,088	5,143	
60 - 65	616	911	528	0	0	0	0	0	0	
55 - 60	890	563	889	0			0	0	0	
50 - 55	699	769	623	0	0		0	0	0	
Below 50	2,607	2,743	3,048	0	0	0	0	0	0	
Min. Temp.	31.4	32.8	30.8	67.9	68.0	67.9	68.0	67.9	67.3	
Mo./Hr.	2 9	2 11	2 9	1 3	1 1	4 2	1 1	4 12	5 5	
Day Type	4	5	4	2	1	3	1	2	1	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING

	ELEC	DEMAND	HOT ₩TR	HOT W DMND
	Off Peak	On Peak	On Peak	On Peak
Month	(kWh)	(kW)	(Therm)	(Thrm/hr)
Jan	292	1	134	0
Feb	264	1	135	0
March	299	1	88	0
April	281	1	39	0
May	381	4	0	0
June	622	5	0	0
July	899	5	0	0
Aug	630	5	0	0
Sept	384	4	. 0	0
0ct	295	1	27	0
Nov	281	1	60	0
Dec	288	1	110	0
Total	4,917	5	592	0

Building Energy Consumption = 34,528 (Btu/Sq Ft/Year)
Source Energy Consumption = 58,742 (Btu/Sq Ft/Year)

Floor Area = 2,202 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- EQUIPMENT ENERGY CONSUMPTION -----

	Equip -	-						umption		0	n-±	M-··	No.=	T.1.1
ım	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS													
	ELEC	291	263	299	281	295	288	288	299	281	295	281	288	3,447
	PΚ	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	(
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD												•	
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	(
	РK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	C
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0 -		0	0	0	0	0	0 .	0
	ÞΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	(
	PK 	0.0	0.0	0.0	0.0	. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD	۸	^	۸.		۸	۸	۸	٥	٥	۸	0	٨	0
	P CHILL	0	0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	۷.0
1	EQ1161			CLD COND			4.0.0	7.0 <b>7</b>						70.
	ELEC	0	0	0	0	13	183	397	185	17	0	0	0	794
	PK	0.0	0.0	0.0	0.0	2.8	2.9	3.0	3.0	2.8	0.0	0.0	0.0	3.0
1	EQ5200			ENSER FAI										
	ELEC	0	0	0	0	1	19	40	19	2	0	0	0	81
	PK	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.3	0.1	0.0	0.0	0.0	0.3
1	EQ5303		CONTI											
	ELEC	0	0	0	0	19	81	121	74	33	0	0	0	328
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
l	EQ4003		FC C	ENTRIF. I	FAN C.V.									
	ELEC	0	0	0	0	53	51	53	53	51	0	0	0	262
	PK	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
l	EQ2102		PURCI	HASED DIS	ST. HOT I	WATER								
	P HOTH20	.134	135	88	39	0	0	0	0	0	27	60	110	592
	PK	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.3

V 600 Trane Air Conditioning Economics By: Trane Customer Direct Service Network PAGE 11 EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING ELEC 1 0 0 0 1 1 5 1 1 0.0 0.0 0.0 0.0 0.0

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UTILITY PEAK CHECKSUMS - ALTERNATIVE 1 BASE BUILDING

Miscellaneous

Base Utilities

Misc Equipment

Lights

Sub Total

Grand Total

	U	T	I	L	I	Ŧ	Y	,	PΕ	: 1	A K	(	C	Н	Ε	C	K	S	į	1	1	S	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
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UTILITY PEAK	CHE	CKSUMS
Utility ELECTRIC DEMAND		
Peak Value 4.8 (kW) Yearly Time of Peak 16 (hr) 7 (mo)		
Hour 16 Month 7		
Eqp. Ref. Equipment Num. Code Name Equipment Description	Utility Demand (kW)	
Cooling Equipment		
1 EQ1161 AIR-CLD COND COMP <15 TONS	3.6	74.63
Sub Total	3.6	74.63
Sub Total	0.0	0.00
Air Moving Equipment		
1 SUMMATION OF FAN ELECTRICAL DEMAND	0.1	2.62
Sub Total	0.1	2.62
Sub Total	0.0	0.00

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Trane Air Conditioning Economics
By: Trane Customer Direct Service Network
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 34

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Weather File Code:
                                CARLISLE
Location:
                                ENERGY SAVINGS OPPORTUNITY STUDY
                                 40.2 (deg)
Latitude:
Longitude:
                                 77.2 (deg)
Time Zone:
                                    5
Elevation:
                                  475 (ft)
Barometric Pressure:
                                 29.2 (in. Hg)
Summer Clearness Number:
                                 1.00
Winter Clearness Number:
                                 1.00
Summer Design Dry Bulb:
                                  92 (F)
Summer Design Wet Bulb:
                                  72 (F)
Winter Design Dry Bulb:
                                   4 (F)
Summer Ground Relectance:
                                 0.20
Winter Ground Relectance:
                                 0.20
Air Density:
                               0.0742 (Lbm/cuft)
                               0.2444 (Btu/lbm/F)
Air Specific Heat:
Density-Specific Heat Prod:
                               1.0882 (Btu-min./hr/cuft/F)
                              4,790.2 (Btu-min./hr/cuft)
Latent Heat Factor:
Enthalpy Factor:
                               4.4519 (Lb-min./hr/cuft)
Design Simulation Period: May
                                   To September
System Simulation Period: January To December
Cooling Load Methodology:
                              CLTD/CLF (Transfer Function Method)
Time/Date Program was Run:
                               11:42:18 1/10/94
                                   CB34 .TM
Dataset Name:
```

AIRFLOW - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

------SYSTEM SUMMARY -------(Design Airflow Quantities)

System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
1	PTAC	95	954	954	1,181	323	0	0
2	RAD	0	0	0	0	319	0	0
Totals		95	954	954	1,181	642	. 0	0

CAPACITY - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- Cooling ------ Reating -----Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating Totals Capacity Capacity Capacity System System Capacity Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (8tuh) 1 PTAC 2.0 0.0 0.0 2.0 -27,105 0 0 0 -27,1052 RAD 0.0 0.0 -38,106 0 0 -38,106 0.0 0.0 0 0 0 2.0 0 0 Totals 0.0 0.0 2.0 -65,212 -65,212

The building peaked at hour 16 month 7 with a capacity of 2.0 tons

ENGINEERING CHECKS - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

------ENGINEERING CHECKS-------ENGINEERING

			Percent		Cool:	Heat				
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
i										
1	Main	PTAC	10.00	1.09	466.1	428.6	28.00	1.09	-30.91	877
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-28.76	1,325

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

******	*******	****** (	COOLING COIL	PEAK ****	*******	******	***** CLG	SPACE	PEAK ****	***** HEATI	NG COIL PEAK	*****
	t Time ==		Mo/Hr:						7/17		Mo/Hr: 13/ 1	
Outside	Air ==>	0.6	DB/WB/HR:	91/73/98.	0		* 0A	D8: 8	39		OADB: 4	
							*		*			
•		Space	Ret. Air		Net	Percnt		ace	Percnt *			
	S	ens.+Lat.	Sensible	Latent	Total	Of Tot	* Sensi	ble	Of Tot *	Space Sens	Tot Sens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	· (Btuh)	(%)	* (Bt	uh)	(%) *	(Btuh)	(8tuh)	(%)
Skylit	e Solr	0	0		0	0.00	*	0	0.00 *	0	0	0.00
Skylit	e Cond	0	0		0	0.00	*	0	0.00 *	0	0	0.00
Roof C	ond	0	0		0	0.00	*	0	0.00 *	0	0	0.00
Glass	Solar	5,165	0		5,165	21.04	* 6,	791	40.64 *	0	0	0.00
Glass	Cond	1,147	0		1,147	4.67	* .	885	5.29 *	-5,483	-5,483	20.23
Wall Co	ond	3,986	- 0		. 3,986	16.23	* 4,	702	28.14 *	-5,764	-5,764	21.27
Partit	ion	0			0	0.00	*	0	0.00 *	0	0	0.00
Expose	d Floor	0			0	0.00	*	0	0.00 *	0	_ 0	0.00
Infilt	ration	8,571			8,571	34.91		002	17.97 *	-15,858	-15,858	58.51
Sub To	tal::>	18,870	0		18,870	76.86	* 15,	379	92.03 *	-27,105	-27,105	100.00
Internal	Loads						*		*			
Lights		1,193	0		1,193	4.86	* 1,	004	6.01 *	0	0	0.00
People		744			744	3.03	*	327	1.96 *	0	0	0.00
Misc		0	0	0	0	0.00	*	0	0.00 *	0	0	0.00
Sub To	tal==>	1,937	0	<b>0</b>	1,937	7.89	<b>*</b> 1,	331	7.97 *	0	0	0.00
Ceiling	Load	0	0		0	0.00		0	0.00 *	0	0	0.00
Outside (	Air	0	0	0	3,542	14.43	*	0	0.00 *	0	0	0.00
Sup. Fan	Heat				203	0.83	*		0.00 *		0	0.00
Ret. Fan	Heat		0		0	0.00			0.00 *		0	0.00
Duct Hear			0		0	0.00			0.00 *		0	0.00
OV/UNDR S	Sizing	0			0	0.00		0	0.00 *	0	0	0.00
Exhaust i			0	0	0	0.00			0.00 *		0	0.00
Terminal	Bypass		0	0	0	0.00	*		0.00 *		0	0.00
							*		*			
Grand  To	tal==>	20,807	0	- 0	24,552	100.00	* 16,	710	100.00 *	-27,105	-27,105	100.00
				LING COIL S							AREAS	
		Capacity	Sens Cap.			ig DB/WB/H			/WB/HR	Gross Total	•	sf) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg		-	-	Grains	Floor	877	
Main Clg	2.0	24.6	17.4	954		69.		55.0	60.2	Part	0	
Aux Clg	0.0	0.0	0.0	0		0.0		0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Roof	0	0 0
Totals	2.0	24.6								Wall	990	102 10
:	UCATTN	ב בחדו פבו	ECTION		AIR	FLONS (cf	m)		NGINEERING	CHECKS	TEMPERATURI	EQ (E)
į	Capacit					Cooling	"', Heating		% OA	10.0	Type Cl	
	(Mbh)	•		Deg F	Vent	95	0	_	Cfm/Sqft		SADB 58	-
Main Htg	-27.	-	954 68.0	94.1	Infil	228	228	_	Cfm/Jon		Plenum 75	
Aux Htg	0.		0 0.0	0.0	Supply	954	954	-	Sqft/Ton		Return 75	
Preheat	-0.		954 62.3	58.7	Mincfm	0	0		Btuh/Sqft		Ret/0A 76	
Reheat	0.		0 0.0	0.0	Return	954	954	-	People		Runarnd 75	
Humidif	0.		0 0.0	0.0	Exhaust	95	0		* 0A			.0 0.0
Opt Vent	0.		0 0.0	0.0	Rm Exh	0	0	_	Cfm/SqFt			.0 0.0
Total	-27.		v.v	V.V	Auxil	0	0	_	Btuh/SqFt			.1 0.0
· · · · ·	_ · •						•			. –	<del>-</del> -	

System 2 Block RAD - RADIATION

Mo/Hr: 0/0 \* Peaked at Time ==> Mo/Hr: 0/0 Mo/Hr: 13/ 1 OAD8/W8/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4 Outside Air ==> \* Space Net Percnt \* Percnt \* Space Peak Coil Peak Space Ret. Air Ret. Air Total Of Tot \* Sensible Of Tot \* Space Sens Tot Sens Of Tot Sens.+Lat. Sensible Latent · (Btuh) (%) \* Envelope Loads (Btuh) (Btuh) (Btuh) (%) \* (Btuh) (Btuh) (Btuh) (%) 0.00 \* 0 0 0 0.00 \* 0 0 0.00 Skylite Solr 0 0 0.00 \* 0 0.00 \* 0 0 Skylite Cond 0 0.00 0 0 0.00 \* 0.00 \* -192 -192 Roof Cond 0 0 0.50 0 0 0.00 \* 0.00 \* 0 0.00 Glass Solar 0 0 0 -7,639 -7,639 -8,074 -8,074 0 0 0 0.00 \* 0 0.00 \* 20.05 Glass Cond 0 0.00 \* 0.00 † Wall Cond 0 - 0 0 21.19 0 0.00 \* 0.00 \* 0 0 0 0.00 Partition 0.00 \* 0 Exposed Floor 0 0 0.00 \* 0 0.00 0.00 \* 0 0.00 \* -22,202 -22,202 0 58.26 Infiltration 0 0.00 \* 0.00 \* -38.106 100.00 Sub Total:=> 0 0 -38,106 \* \* Internal Loads 0.00 \* 0.00 \* 0.00 Lights 0 0 0 0 0 0 0 0 0.00 \* 0.00 \* 0 0.00 People 0.00 \* 0.00 \* 0 0.00 Misc 0 0 Û 0 0.00 \* 0 0 0.00 \* 0 0 0.00 Sub Total==> C 0 0 . 0 0 0 0 0.00 \* 0.00 \* Ceiling Load 0 0.00 0 0 0.00 \* 0 0.00 \* ٥ 0 0.00 Outside Air 0.00 \* 0.00 \* Sup. Fan Heat 0 0.00 Ret. Fan Heat 0.00 \* 0.00 \* 0.00 0 0 0.00 \* 0.00 \* 0.00 Duct Heat Phup 0 0 0.00 \* 0.00 \* 0.00 0 0 OV/UNDR Sizing 0 0.00 \* 0.00 \* 0.00 Exhaust Heat 0 0 Terminal Bypass 0 0 0.00 \* 0.00 \* 0.00 0 0.00 \* 0.00 \* -38,106 0 0 - 0 -38,106 100.00 Grand |Total==> ------COOLING COIL SELECTION----------AREAS-----Entering D8/WB/HR Leaving D8/WB/HR Total Capacity Sans Cap. Coil Airfl Gross Total Glass (sf) (%) Deg F Deg F Grains Deg F Deg F Grains (Tons) (Mbh) (Mbh) (cfm) Floor 1.325 Main Clq 0.0 0.0 0.0 0 0.0 0.0 0.0 0.0 Part 0.0 0.0 0 0.0 Aux Cla 0.0 0.0 0.0 0.0 0.0 0.0 ExFlr 0 0.0 0.0 0.0 Opt Vent 0.0 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 Roof 41 0 1,386 0.0 0.0 Wall Totals 142 10 -----HEATING COIL SELECTION----------AIRFLOWS (cfm)-------ENGINEERING CHECKS---- TEMPERATURES (F)---Capacity Coil Airfl Ent Lva Type Cooling Heating Clq % OA 0.0 Type Clg Hta (cfm) 0 Clg Cfm/Sqft 0.00 SADB 0.0 68.1 (Mbh) Deg F Deg F Vent 0 0 Main Htg -38.1 0.0 0.0 Infil 0 319 Cla Cfm/Ton 0.00 Plenum 0.0 68.0 0.00 0.0 68.0 0.0 0 0.0 0.0 0 0 Clg Sqft/Ton Return Aux Htg Supply 0 0.0 0.0 0.0 0 0 Clg Btuh/Sqft 0.00 Ret/OA 0.0 68.0 Preheat Mincfm 0 0.0 0 0 0.0 0.0 Return 0 No. People Runarnd 0.0 68.0 Reheat 0 0.0 0.0 0 Htg % DA 0.0 Fn MtrTD 0.0 0.0 0.0 Exhaust 0 Humidif. 0.0 0.0 Rm Exh 0 0 0 Opt Vent 0.0 Hta Cfm/SaFt 0.00 Fn BldTD 0.0 0.0 Total -38.1 Auxil 0 Htg Btuh/SqFt -28.76 Fn Frict 0.0 0.0

BUILDING U-VALUES - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

					Roo	m U-Val	ues				Room	Room
					(Btu	ı/hr/sqf	t/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	DEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.92
2	UTILITY ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	13.3	5.31
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	12.3	5.09
5	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
7	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.5	4.69
8	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.90
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.0	4.80
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.8	4.75
1	DEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.92
2	UTILITY ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	13.3	5.31
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	12.3	5.09
3	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.0	4.56
4	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.7	4.28
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	9.3	4.41
5	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
6	BATH	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.1	4.59
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.1	4.59
7	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.5	4.69
8	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.90
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.0	4.80
9	VEST & CLOSET	0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	19.5	6.88
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	19.5	6.88
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	10.6	4.72
Buildin	g	0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	10.7	4.73

BUILDING AREAS - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

------ BUILDING AREAS -----

				Floor	Total		Eunagad						
		Numbe	er of	Area/Dupl	Floor	Partition	Exposed Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Ocen		Dupl		Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Room Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	. (%)	(sqft)	(sqft)	(%)	(sqft)
Rumper	Description	111	KIII	(3411)	(3416)	(3411)	(SQIE)	(5416)	(%)	(5411)	(3416)	(0)	(3411)
1	DEN	1	1	165	165	0	0	0	0	0	27	12	193
2	UTILITY ROOM	1	1	125	125	0	0 .	0	0	0	9	4	193
Zone	1 Total/Ave.				. 290	0	0	0	0	0	36	9	387
5	DINING ROOM	1	1	204	204	0	0	0	0	0	25	20	97
Zone	3 Total/Ave.				204	0	0	0	0	0	25	20	97
7	BEDROOM NO. 1	1	1	194	194	0	0	0	0	0	12	6	186
8	LIVING ROOM	1	1	189	189	0	0	0	0	0	29	12	219
Zone	5 Total/Ave.				383	0	0	0	0	0	41	9	404
System	<pre>1 Total/Ave.</pre>				877	0	0	0	0	0	102	10	888
1	DEN	1	1	165	165	0	0	0	0	0	27	12	193
2	UTILITY ROOM	1	1	125	125	. 0	0	0	0	0	9	4	193
Zone	1 Total/Ave.				290	0	0	0	0	0	36	9	387
3	BEDROOM NO. 2	1	1	170	170	0	0	0	0	0	12	8	141
4	KITCHEN	1	1	187	187	0	0	0	0	0	8	7	105
Zone	2 Total/Ave.				357	0	0	0	0	0	20	8	246
5	DINING ROOM	ì	1	204	204	0	0	0	0	0	25	20	97
Zone	3 Total/Ave.				204	0	0	0	0	0	25	20	97
6	BATH	1	1	50	50	0	0	0	0	0	7	14	43
Zone	4 Total/Ave.				50	0	0	0	0	0	7	14	43
7	BEDROOM NO. 1	i	1	194	194	0	0	0	0	0	12	6	186
8	LIVING ROOM	1	1	189	189	0	0	0	0	0	29	12	219
Zone	5 Total/Ave.			-	383	0	0	0	0	0	41	9	404
9	VEST & CLOSET	1	1	41	41	0	0	0	0	41	14	17	68
Zone	6 Total/Ave.				41	0	0	0	0	41	14	17	68
System	<pre>2 Total/Ave.</pre>				1,325	0	0	0	0	41	142	10	1,244
Buildin	g				2,202	0	0	0	0	41	245	10	2,131

ASHRAE 90 ANALYSIS - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

----- A S H R A E 9 O A N A L Y S I S -----

Overall Roof U-Value = 0.073 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.174 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.173 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 5.54 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 14.04 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

#### System Totals

Percent	Cool	ling Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.1	22	289	-3,261	15	738	47.7	0	0	0.0	0	0
5 - 10	0.2	15	207	-6,521	. 13	618	95.4	0	0	0.0	0	0
10 - 15	0.3	11	142	-9,782	15	747	143.1	0	0	0.0	0	0
15 - 20	0.4	3	39	-13,042	21	1,000	190.7	42	1,530	0.0	0	0
20 - 25	0.5	7	91	-16,303	17	814	238.4	0	0	0.0	0	0
25 - 30	0.6	9	117	-19,563	12	588	286.1	0	0	0.0	0	0
30 - 35	0.7	5	64	-22,824	7	338	333.8	0	0	0.0	0 ^	0
35 - 40	0.8	3	44	-26,085	0	0	381.5	0	0	0.0	0	0
40 - 45	0.9	9	122	-29,345	0	0	429.2	0	0	0.0	0	0
45 - 50	1.0	7	98	-32,606	0	0	476.9	21	765	0.0	0	0
50 - 55	1.1	1	11	-35,866	0	0	524.5	0	0	0.0	0	0
55 - 60	1.2	3	42	-39,127	0	0	572.2	0	0	0.0	0	0
60 - 65	1.3	3	40	-42,388	0	0	619.9	0	0	0.0	0	0
65 - 70	1.4	0	0	-45,648	0	0	667.6	0	0	0.0	0	0
70 - 75	1.5	0	0	-48,909	0	0	715.3	0	0	0.0	0	0
75 - 80	1.6	1	20	-52,169	0	0	763.0	0	0	0.0	0	0
80 - 85	1.7	1	11	-55,430	0	0	810.7	0	0	0.0	0	0
<b>85 -</b> 90	1.8	0	0	-58,690	0	0	858.3	0	0	0.0	0	0
90 - 95	1.9	0	0	-61,951	0	0	906.0	0	0	0.0	0	0
95 - 100	2.0	0	0	-65,212	0	0	953.7	38	1,377	0.0	0	0
Hours!Off	0.0	0	7,423	. 0	0	3,917	0.0	0	5,088	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

					BUI	LDI	N G	TEM	PERA	ATURE PROFILES
Temperature Range	1	3	 5	1	2	3		<b></b> 5		Zone Number
(F)										
Max. Temp.	81.7	78.9	83.1	105.4	105.8	107.5	110.1	102.6	104.1	
Mo./Hr.	7 14	7 14	7 14	8 20	8 21	7 22	8 18	7 21	7 19	
Day Type	1	1	1	1	1	1	1	. 1	1	
									Nam	nber of Hours
Above 100	0	0	۰۰۰۰۰				1,500		1101	and of hours
95 - 100	0	-			1,249		1,040			
90 - 95	0	0		1,107				1,057		
85 - 90	0	0								
80 - 85	0	0	-				90	808		
75 - 80	2,330	•	•			0	0	35		
75 - 80 70 - 75	2,330 895		1,069					0		
								_		
65 - 70	800	221					4,672 0			
60 - 65	741	927	674	0		-		0	0	
55 - 60	792	527	816		-		0	0	0	
50 - 55	662	755						0		
Below 50	2,540	2,658	2,895	0	0	0	0	0	0	
Min. Temp.	32.5	33.5	31.5	67.9	67.9	67.9	67.9	67.9	67.3	
Mo./Hr.	2 9	2 11	2 9	1 6	2 15	1 7	3 6	3 17	5 5	
Day Type	4	٤	4	2	2	2	3	2	1	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

------ MONTHLY ENERGY CONSUMPTION ------

•	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak	On Peak	On Peak	On Peak
Month	(k₩h)	(kW)	(Therm)	(Thrm/hr)
Jan	292	1	118	0
Feb	264	1	118	0
March	299	1	76	0
April	281	1	31	0
May	397	4	0	. 0
June	625	4	0	0
July	892	5	0	0
Aug	631	4	0	0
Sept	384	4	0	0
0ct	295	1	22	0
Nov	281	1	52	. 0
Dec	288	1	98	0
Total	4,930	5	515	0

Building Energy Consumption = 31,015 (Btu/Sq Ft/Year)
Source Energy Consumption = 54,092 (Btu/Sq Ft/Year)

Floor Area = 2,202 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

------ EQUIPMENT ENERGY CONSUMPTION------ EQUIPMENT ENERGY

	Equip -	_						umption						
ım	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Tota
0	LIGHTS		<b>3</b> / <b>5</b>	200	004	005	222	222	000	001	005	001	222	<b>.</b>
	ELEC	291	263	299	281	295	288	288	299	281	295	281	288	3,44
	PK	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	-
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	
	ÞK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
5	MISC LD													
	P HOTH20	0	0	0	0	0 0.0	0 0.0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
ś	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
1	EQ1161			CLD COND										
	ELEC	0	0	0	0	17	187	387	187	19	0	0	0	79
	PK	0.0	0.0	0.0	0.0	2.6	2.7	2.8	2.7	2.6	0.0	0.0	0.0	2.
i	EQ5200		CONDE	ENSER FAI	<b>1</b> S									
	ELEC	0	0	0	0	2	19	39	19	2	0	0	0	8
	PK	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.2	0.1	0.0	0.0	0.0	0.
1	EQ5303		CONTR	ROLS										
	ELEC	0	0	0	0	32	81	127	74	33	0	0	0	34
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.
1	EQ4003		FC CE	ENTRIF. I	FAN C.V.									
	ELEC	0	0	0	0	51	50	51	51	50	0	0	0	25
	PK	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	. 0.
1	EQ2102		PURC	HASED DIS	ST. HOT W	VATER								
	P HOTH20	118	118	76	31	0	0	0	0	0	22	52	98	51
	PK	0.2	0.2	0.2		0.0	0.0	0.0		0.0	0.1	0.1	0.2	. 0.

V 600 PAGE 23

0.0

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

> ELEC 1 1 0 1 1 PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

### UTILITY PEAK CHECKSUMS - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

**Grand Total** 

	TINTE & CHOCKI		0 11 5 6		
	ELECTRIC DE	UTILITY PEAK MAND	CHEL	, , 5 U M 5	-
Peak Val	lue 4.6	(kW)			
-		16 (hr) 7 (mo)			
Hour 16	Month 7				
	Equipment Code Name	Equipment Description		Of Tot	
Cooling	Equipment				
1	EQ1161	AIR-CLD COND COMP <15 TONS	3.4	73.44	
Sub Tota	al		3.4	73.44	
Sub Tota	al		0.0	0.00	
Air Movi	ing Equipment				
1		SUMMATION OF FAN ELECTRICAL DEMAND	0.1	2.66	
Sub Tota	al	•	0.1	2.66	
Sub Tota	al		0.0	0.00	
Miscella	ineous				
Lights			1.1		
	ilities quipment		0.0	0.00 0.00	
Sub Tota			1.1		

4.6 100.00

Building 040
Trace Input File

```
CONTENTS OF : E:\CB40.TM
LINE # -----
   1
       JOB - 1
   2
       01/ENERGY SAVINGS OPPORTUNITY STUDY
   3
       01/CARLISLE BARRACKS. PA
   4
       01/DEPARTMENT OF THE ARMY
   5
       01/BENATEC ASSOCIATES
       01/BUILDING 40
   6
   7
       08/CARLISLE
   8
       09/MAY/SEP///APR/OCT
  9
       10/CLTD-CLF
 10
       11///ZONE
       LOAD - 1
 11
 12
       19/1/BASE BUILDING
       20/1/1/1ST FL APT'S/3791/1/3/.9/.45
 13
 14
       20/2/2/2ND FL APT'S/4046/1/1/0
 15
       20/3/3/LAUNDRY ROOM/88/1/3/.9/.45
 16
       20/4/4/MECH ROOM/167/1/3/0
 17
       21/1///CBLQTX///CBLQTX
 18
       21/2///CBLQTX///CBLQTX
 19
       21/3///CBLQTX///CBLQTX
 20
       21/4///CBLQTX///CBLQTX
 21
       22/2/1/YES////151
 22
       22/4/1/YES////152
 23
       24/1/1/34/8//153/30
 24
       24/1/2/112/8//153/120
 25
       24/1/3/112/8//153/300
 26
      24/2/1/34/8.5//153/30
 27
      24/2/2/119/8.5//153/120
 28
      24/2/3/34/8.5//153/210
 29
      24/2/4/119/8.5//153/300
 30
      24/3/1/7/8//153/120
 31
      24/3/2/11/8//153/210
 32
      24/4/1/14/7.4//141/120
 33
      24/4/2/11/7.7//141/210
      24/4/3/14/7.8//141/300
 34
 35
      25/1/1/4.3/2.3/2/.7/.64
 36
      25/1/2/4.3/2.3/16/.7/.64
 37
      25/1/3/4.3/2.3/16/.7/.64
 38
      25/2/1/4.3/2.3/2/.7/.64
 39
      25/2/2/4.3/2.3/20/.7/.64
 40
      25/2/3/4.3/2.3/2/.7/.64
 41
      25/2/4/4.3/2.3/20/.7/.64
 42
      25/3/2/2.7/1.3/1/1.04/1
 43
      25/4/3/2.75/1.5/2/1.04/1
      26/1/CBLQP/CBLQL/CBLQP//OFF/CBLQFAN/OFF/OFF/OFF/OFF
 44
 45
      26/2/CBLQP/CBLQL/CBLQP//OFF/CBLQFAN/OFF/OFF/OFF/OFF
 46
      26/3/CBLQP/CBLQL/OFF//OFF/OFF/OFF/OFF/OFF
      26/4/OFF/OFF/OFF//OFF/HTGONLY/HTGONLY/OFF/OFF
 47
      27/1/10/PEOPLE/230/190/.5/WATT-SF/INCAND
 48
      27/2/10/PEOPLE/230/190/.5/WATT-SF/INCAND
 49
      27/3/1/PEOPLE/315/325/1.5/WATT-SF
 50
      29/1/15/PCT-MCLG/15/PCT-MHTG/.33/CFM-SF/.33/CFM-SF
 51
 52
      29/2/15/PCT-MCLG/15/PCT-MHTG/.33/CFM-SF/.33/CFM-SF
      29/3/////.33/CFM-SF
 53
 54
      29/4/////.33/CFM-SF
 55
      30/1/1.5/CFM-SF/1.5/CFM-SF
 56
      30/2/1.5/CFM-SF/1.5/CFM-SF
 57
      30/4/1.5/CFM-SF
 58
      SYSTEM - 1
```

```
CONTENTS OF : E:\CB40.TM
LINE #
  59
       39/1/BASE BUILDING
  60
       40/1/FC
  61
       41/1/1/2
  62
       42/1/.25/.25
  63
       45/1/CBLQCLG/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
  64
       40/2/RAD
       41/2/3/3
  65
  66
       42/2
  67
       45/2/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
  68
       40/3/UH
 69
       41/3/4/4
  70
       42/3/.20
 71
       45/3/HTGONLY/OFF/OFF/OFF/OFF/HTGONLY/OFF/OFF/OFF/OFF
  72
       EQUIPMENT - 1
 73
       59/1/CARLISLE///BASE BUILDING
       60/1/1/PKPLANT/1/1
  74
 75
       62/1/EQ1161/36/7.267/MBH
       65/1/1//1/3
 76
 77
       67/1/EQ2102/1
 78
       69/1/EQ4371
 79
       69/3
       LOAD - 2
 80
       19/2/WALL & ROOF INSULATION
 81
       20/1/1/1ST FL APT'S/3791/1/3/.9/.45
 82
       20/2/2/2ND FL APT'S/4046/1/1/0
 83
 84
       20/3/3/LAUNDRY ROOM/88/1/3/.9/.45
 85
       20/4/4/MECH ROOM/167/1/3/0
       21/1///CBLQTX///CBLQTX
  86
 87
       21/2////CBLQTX///CBLQTX
 88
       21/3///CBLQTX///CBLQTX
 89
       21/4///CBLQTX///CBLQTX
 90
       22/2/1/YES////144
 91
       22/4/1/YES////152
 92
       24/1/1/34/8//143/30
 93
       24/1/2/112/8//143/120
       24/1/3/112/8//143/300
 94
       24/2/1/34/8.5//143/30
 95
 96
       24/2/2/119/8.5//143/120
 97
       24/2/3/34/8.5//143/210
       24/2/4/119/8.5//143/300
 98
 99
       24/3/1/7/8//143/120
       24/3/2/11/8//143/210
100
       24/4/1/14/7.4//141/120
101
102
       24/4/2/11/7.7//141/210
103
       24/4/3/14/7.8//141/300
104
       25/1/1/4.3/2.3/2/.7/.64
       25/1/2/4.3/2.3/16/.7/.64
105
       25/1/3/4.3/2.3/16/.7/.64
106
       25/2/1/4.3/2.3/2/.7/.64
107
108
       25/2/2/4.3/2.3/20/.7/.64
109
       25/2/3/4.3/2.3/2/.7/.64
       25/2/4/4.3/2.3/20/.7/.64
110
       25/3/2/2.7/1.3/1/1.04/1
111
       25/4/3/2.75/1.5/2/1.04/1
 112
       26/1/CBLQP/CBLQL/CBLQP//OFF/CBLQFAN/OFF/OFF/OFF
113
       26/2/CBLQP/CBLQL/CBLQP//OFF/CBLQFAN/OFF/OFF/OFF
114
115
       26/3/CBLQP/CBLQL/OFF//OFF/OFF/OFF/OFF/OFF
       26/4/OFF/OFF/OFF//OFF/HTGONLY/HTGONLY/OFF/OFF/OFF
116
```

```
CONTENTS OF : E:\CB40.TM
LINE #
       27/1/10/PEOPLE/230/190/.5/WATT-SF/INCAND
117
       27/2/10/PEOPLE/230/190/.5/WATT-SF/INCAND
118
119
       27/3/1/PEOPLE/315/325/1.5/WATT-SF
       29/1/15/PCT-MCLG/15/PCT-MHTG/.27/CFM-SF/.27/CFM-SF
120
       29/2/15/PCT-MCLG/15/PCT-MHTG/.27/CFM-SF/.27/CFM-SF
121
122
       29/3/////.27/CFM-SF
123
       29/4/////.27/CFM-SF
       30/1/1.5/CFM-SF/1.5/CFM-SF
124
125
       30/2/1.5/CFM-SF/1.5/CFM-SF
126
      30/4/1.5/CFM-SF
127
      SYSTEM - 2
      39/2/WALL & ROOF INSULATION
128
       40/1/FC
129
      41/1/1/2
130
      42/1/.25/.25
131
       45/1/CBLQCLG/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF
132
       40/2/RAD
133
134
      41/2/3/3
      42/2
135
      45/2/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
136
137
      40/3/UH
      41/3/4/4
138
      42/3/.20
139
      45/3/HTGONLY/OFF/OFF/OFF/OFF/HTGONLY/OFF/OFF/OFF
140
141
      EQUIPMENT - 2
142
      59/2/CARLISLE///WALL & ROOF INSULATION
      60/1/1/PKPLANT/1/1
143
      62/1/EQ1161/36/7.267/MBH
144
145
      65/1/1//1/3
146
      67/1/EQ2102/1
147
      69/1/EQ4371
```

69/3

148

Building 040
Trace Output File

```
Trane Air Conditioning Formamics

By: Trane Distance Ciract Salvice Natwork
```

EMERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, TA DEPARTMENT OF THE ARMY BENATES ASSOCIATES SUILDING 40

Meathar File Code: CARLISLE Location: ENERGY SAVINGS OPPORTUNITY STUDY 40.2 (deg) Latitude: 77.2 (deg) Longitude: 5 Time Zone: 475 (ft) Elevation: 29.2 (in. Hg) Barometric Pressure: Summer Clearness Number: 1.00 1.00 Winter Clearness Number: 92 (F) Summer Design Dry Bulb: 72 (F) Summer Design Wet Bulb: 4 (F) Winter Design Dry Bulb: Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 0.0742 (Lbm/cuft) Air Density: | Air Specific Heat: 0.2444 (Btu/lbm/F) 1.0882 (Btu-min./hr/cuft/F) Density-Specific Heat Prod: Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft) Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14:58:35 1/11/94
Dataset Name: CB40 .TM

AIRFLOW - ALTERNATIVE 1 BASE BUILDING

------ S Y S T E M S U M M A R Y ------ (Design Airflow Quantities)

System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
1	FC	1,763	11,755	11,755	13,295	3,303	0	0
2	RAD	0	0	0	0	48	0	0
3	UH	0	0	268	0	98	0	0
Totals		1,763	11,755	12,023	13,295	3,448	0	0

CAPACITY - ALTERNATIVE 1
BASE BUILDING

------ Cooling ------ Heating -------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Capacity Totals
Number Type (Tons) (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) 

 16.1
 0.0
 0.0
 16.1
 -220,087

 0.0
 0.0
 0.0
 0.0
 -5,535

 0.0
 0.0
 0.0
 0.0
 -16,600

 16.1
 0.0
 0.0
 15.1
 -242,222

 0 -87,105 1 FC 0 0 - 0 -220,087 0 0 0 0 -5,535 0 0 0 0 -16,600 0 0 0 -242,222 0 0 2 RAD 3 UH 0 0 0 -87,105 Totals

The building peaked at hour 16 month 7 with a capacity of 16.1 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

-----ENGINEERING CHECKS------

			Percent		Cool:	ing		Heat	ing	
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	8tuh/ Sq Ft	Floor Area Sq Ft
1	Main	FC	15.00	1.50	731.2	487.5	24.62	1.50	-28.08	7,837
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-62.90	88
3	Main	UH	0.00	0.00	0.0	0.0	0.00	1.60	-99.40	167

System 1 Block FC - FAN COIL

					*******					** <b>*</b> *** HEAT			*****
	t Time =		Mo/Hr:				•		7/17 *		Mo/Hr: 13	•	
Outside	Air ==>	UA	iDB/WB/HR:	91 <i>  13 </i> 98.0	)	4	. OA	DB:	89 * *		OADB:	4	
		Space	Rot Cir	Ret. Air	Net	Parcht 1	Sr	ace	Percnt *	Space Pea	k Coil P	eak	Percnt
		Sens.+Lat.	Sensible	Latent	Total	Of Tot 3			Of Tot *	Space Sen			Of Tot
Envelope		(Btuh)	(Btuh)	(Btuh)	(8tuh)	(%)		uh)	(%) *	(Btuh			(%)
	e Solr	0	0	(bean)	0	0.00		0	0.00 *	-	) (	0	0.00
-	e Cond	0	0		0	0.00		0	0.00 *		)	0	0.00
Roof C		18,445	0		18,445	9.56		021	13.98 *		7 -15,	057	7.07
Glass		33,606	0		33,606	17.42		692	28.47 *		)	0	0.00
Glass		7,482	0		7,482	3.88	-	128	5.53 *	-35,58	5 -35,	586	16.71
Wall C		24,246	1,157		25,402	13.17		129	20.27 *	-52,57			25.89
Partit		, 0	,		0	0.00		0	0.00 *	•	)	0	0.00
	d Floor	0			0	0.00	:	0	0.00 *	(	)	0	0.00
•	ration	42,137			42,137	21.84	23,	789	18.46 *	-107,21	-107,	216	50.33
Sub To		125,917	1,157		127,073	65.87			86.71 *	-210,430	-213,	016	100.00
Internal	Loads	·				*	:		*				
Lights		10,699	0		10,699	5.55	10,	967	8.51 *	(	)	0	0.00
People		7,388			7,388	3.83 *	3,	818	2.96 *	(	)	0	0.00
Misc		0	0	0	0	0.00	:	0	0.00 *	(	)	0	0.00
Sub To	tal==>	18,087	0	0	18,087	9.38 *	14,	785	11.47 *	(	)	0	0.00
Ceiling	Load	2,702	-2,702		0	0.00	2,	341	1.82 *	-2,43	?	0	0.00
Outside	Air	0	0	0	47,733	24.74		0	0.00 *	•	)	0	0.00
Sup. Fan	Heat				2,508	1.30 *			0.00 *			0	0.00
Ret. Fan	Heat		0		. 0	0.00 *			0.00 *		•	0	0.00
Duct Hea	t Pkup		0		0	0.00 *			0.00 *			0	0.00
OV/UNDR		0			0	0.00 *		0	0.00 *	(	)	0	0.00
Exhaust			-2,489	0	-2,489	-1.29 *			0.00 *			0	0.00
Terminal	Bypass		0	0	0	-0.00 *			0.00 *			0	0.00
- 1						*			*				
Grand To	tal==>	146,706	-4,035		192,912	100.00 *	128,	884	100.00 *	-212,862	2 -213,	016	100.00
			C00l							~~~~~			
		Capacity	Sens Cap.			g DB/WB/HR		_	B/WB/HR	Gross Total		s (sf)	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg			_	Grains		7,837		
Main Clg	16.1	192.9	155.0		78.5 67			62.5		Part	0		
Aux Clg	0.0	0.0	0.0	0.		.0 0.0		0.0	0.0	ExFlr	0		
Opt Vent	0.0		0.0	0	0.0 0	.0 .0.0	0.0	0.0	0.0		1,046		0 0
Totals	16.1	192.9								Wall 4	1,665	77	1 17
	HEATI	NG COIL SEL	ECTION		AIR	FLOWS (cfm	)		ENGINEERING	CHECKS	TEMPERA	TURES	(F)
	Capaci	ty Coil A	irfl Ent	Lvg	Type ·	Cooling	Heating	Cl	g % OA	15.0	Type	Clg	Htg
	(Mbh	) (cf	m) Deg F	Deg F	Vent	1,763	0	Cl	g Cfm/Sqft	1.50	SADB	64.9	84.6
Main Htg	-220	.1 11,	755 67.4	84.6	Infil	1,539	1,539		g Cfm/Ton	731.25	Plenum	76.3	66.8
Aux Htg	0	.0	0.0		Supply	11,755	11,755		g Sqft/Ton	487.50	Return	76.3	67.4
Preheat	-87		755 57.9		Mincfm	0	0		g Btuh/Sqft	24.62	Ret/OA	78.4	67.4
Reheat	0		0.0		Return	11,755	11,755		. People	20	Runarnd	75.0	68.0
Humidif	0		0.0			1,763	0		g % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0		0.0		Rm Exh	0	0		g Cfm/SqFt	1.50	Fn BldTD	0.0	0.0
Total	-220	.1			Auxil	0	0	Ht	g Btuh/SqFt	-28.08	Fn Frict	0.1	0.1

by: Thank dastoner birdes borvios nothern

System	2	Block	RAD	- RADIAT	ION									
			COOLING COIL		********	******								******
Peaked a			Mo/Hr:				*		r: 0,			Mo/Hr: 13		
Outside	Air ==>	96	ADB/WB/HR:	0/ 0/ 0	0.0		*	OAD	B: (	) *		OADB:	4	
							*	_		*				
		Space		Ret. Air		et Percnt		Spa		Percnt *				Percnt
		Sens.+Lat.	Sensible					Sensib		Of Tot *				Of Tot
Envelope		(Btuh)	(Btuh)					(Btu	-	(%) *		•		(%)
Skylit		0	0			0 0.00			0	0.00 *		0	0	0.00
Skylit		0	0			0 0.00			0	0.00 *		0	0	0.00
Roof C		0	0			0.00			0	0.00 *		0	0	0.00
Glass		0	0			0 0.00			0	0.00 *	0.	0	0	0.00
Glass		0	0			0.00			0	0.00 *	-24		244	4.41
Wall C		0	0			0.00			0	0.00 *				35.80
Partit		0				0.00			0	0.00 *		0	0	0.00
-	d Floor	0				0 0.00			0	0.00 *		0	710	0.00
	ration	0				0.00			0	0.00 *			310	59.79
	tal==>	0	0	•		0 0.00	*		0	0.00 *		52 -5,	535	100.00
Internal							*			*			•	0.00
Lights		0	0			0 0.00			0	0.00 *		0	0	0.00
People		0				0.00			0	0.00 *		0	0	0.00
Misc		0	0			0 0.00			0	0.00 *		0	0	0.00
	tal==>	0	0	-	)	0 0.00			0	0.00 *		0	0	0.00
Ceiling		0	0			0 0.00			0	0.00 *			0	0.00
Outside		0	0	(	)	0 0.00			0	0.00 *		0	0	0.00
Sup. Fan	Heat					0.00				0.00 *			0	0.00
Ret. Fan			0			0 0.00				0.00 *			0	0.00
Duct Hea			0			0 0.00			_	0.00 *		^	0	0.00
OV/UNDR		0	_			0 0.00			0	0.00 *		0	0	0.00
Exhaust			0	-		0.00				0.00 *			0	0.00
Terminal	Bypass		0	(	)	0 0.00	) * _			0.00 *			0	0.00
Grand To	+-1>	0	0	. (	· .	0 0.00	* \		0	0.00 *	-5 5.º	35 -5,	535	100.00
Granu Tu	ta1/	V	V		,	0.00	, ,		U	0.00	3,30	,,	303	100.00
			coo	LING COIL										
	Tota	l Capacity	Sens Cap.	Coil Airf	l Enter	ing DB/WE	3/HR	Leavi	ng DB,	/WB/HR	Gross Tota			) (%)
-	(Tons	) (Mbh)	(Mbh)	(cfm)	Deg F [	eg F Gra	ains	Deg F D	eg F	Grains	Floor	88		
Main Clg	0.		0.0		0.0		0.0	0.0	0.0	0.0	Part	0		
Aux Clg	0.	0.0	0.0	(	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.	0.0	0.0	(	0.0	0.0	0.0	0.0	0.0	0.0	Roof	0		0 0
Totals	0.	0.0									Wall	144		4 2
	UEAT	ואכ כמזו פרו	ECTION			AIRFLOWS (	cfm).		F1	NGINEERING	CHECKS	TEMPERA	TURES	(F)
	Сарас			Lvg	Type `	Cooling		Heating		% OA	0.0	Type	Clg	Htg
	uapac (Mb	-		_	Vent	COULTING		0		Cfm/Sqft	0.00	SADB	-0.0	-
Main Uta		n) (c) 5.5	0.0 0.0		Infil	(		48		Cfm/Ton	0.00	Plenum	0.0	
Main Htg			0 0.0		Supply	0		0		Sqft/Ton	0.00	Return	0.0	
Aux Htg Preheat		0.0 0.0	0 0.0		Mincfm	(		0		Btuh/Sqft		Ret/OA	0.0	
		0.0	0 0.0		Return	C		0	_	People	0.00	Runarnd	0.0	
Reheat Humidif		0.0	0 0.0		Exhaust	(		0		% OA	0.0	Fn MtrTD	0.0	
Opt Vent		0.0	0 0.0		Rm Exh	C		0		Cfm/SqFt	0.00	Fn BldTD	0.0	
•			v v.v	٧.٧	Auxil	(		0	_	Btuh/SqFt		Fn Frict	0.0	
Total	-	5.5			MUXII		,	V	nty	o cany sqr t	02.70	111 11100	v. v	V.0

System 3 Block UH - UNIT HEATERS

Outside (	t		Mo/Hr: DB/WB/HR:	0/0 _0/_0/_0.	٥		*		/Hr: 0 ADB:	)/0 * 0 *		Mo/Hr: OADB:	13/ 1	
0013106	111/	Un	יאון שטן אווי.	0, 0, 0.	V		*	J.	100.	*		oneo.	7	
		Space	Ret. Air		Net		*		pace	Percnt *	-		Peak	Percnt
	Se	ns.+Lat.	Sensible		Total		*	Sensi		Of Tot *	•		Sens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(8tuh)	(8tuh)		*	(B1	tuh)	(%) *		h) (	8tuh)	(%)
Skylite	e Solr	0	0		0		*		0	0.00 *		0	0	0.00
Skylite	e Cond	0	0		. 0		*		0	0.00 *		0	0	0.00
Roof Co	ond	0	0		0				0	0.00 *	•	28 -	4,428	26.67
Glass S	Solar	0	0		0		*		0	0.00 *		0	0	0.00
Glass (	Cond	0	0		0		*		0	0.00 *			-573	3.45
Wall Co	ond	0	0		0	0.00	*		0	0.00 *	-4,7	62 -	4,762	28.69
Partit:	ion	0			0	0.00	*		0	0.00 *		0	0	0.00
Expose	d Floor	0			0	0.00	*		0	0.00 *		0	0	0.00
Infilt	ration	0			0	0.00	*		0	0.00 *	-6,8	37 -	6,837	41.19
Sub Tot	tal==>	0	0		0	0.00	*		0	0.00 *	-16,60	00 -1	6,600	100.00
Internal	Loads						*			*				
Lights		0	0		0	0.00	*		0	0.00 *		0	0	0.00
People		0			0	0.00	*		0	0.00 *		0	0	0.00
Misc		0	0	0	0		*		0	0.00 *		0	0	0.00
Sub 'Tot	cal==>	0	0	0	0		*		0	0.00 *		0	0	0.00
Ceiling U		0	0		0		*		0	0.00 *		0	0	0.00
Outside A		0	0	0	0		*		0	0.00 *		0	0	0.00
Sup. Fan		-			0					0.00 *			0	0.00
Ret. Fan			0		. 0					0.00 *			0	0.00
Duct Heat			0		0					0.00 *			0	0.00
OV/UNDR S		0			0				0	0.00 *		0	0	0.00
Exhaust h	-		0	0	0					0.00 *			0	0.00
Terminal			0	.0	0					0.00 *			0	0.00
	0,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		•		·	****	*			*				
Grand   Tot	al==>	0	0	. 0	0	0.00	*		0	0.00 *	-16,60	00 -1	6,600	100.00
!														
				LING COIL S						/wa /un	Canaa Tat	AREAS		·
;	Total C		Sens Cap.			ng D8/W8/			_	/WB/HR	Gross Tota		ass (sf	) (%)
· · • • ·	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De	-			-	Grains	Floor	167		
lain Clg	0.0	0.0	0.0	0			.0	0.0	0.0	0.0	Part	0		
lux Clg	0.0	0.0	0.0	0			0.0	0.0	0.0	0.0	ExFlr	0		
pt Vent	0.0	0.0	0.0	0	0.0	0.0 0	.0	0.0	0.0	0.0	Roof	167		0 0
otals	0.0	0.0								,	Wall	297		8 3
	HEATING	COTI SELI	ECTION		AI	RFLOWS (c	fm)		E	NGINEERING	CHECKS	TEMPE	RATURES	(F)
	Capacity				Type ·	Cooling		ating		% OA	0.0	Туре	Clg	
	(Mbh)	(cfr		Deg F	Vent	0		0		Cfm/Sqft	0.00	SADB	-	125.0
lain Htg	-16.6		268 68.0	125.0	Infil	0		98		Cfm/Ton	0.00	Plenum	0.0	
ux Htg	0.0		0 0.0	0.0	Supply	0		268	-	Sqft/Ton	0.00	Return	0.0	
reheat	0.0		0 0.0	0.0	Mincfm	0		0	_	Btuh/Sqft		Ret/OA	0.0	
leheat	0.0		0 0.0	0.0	Return	0		268		People	0.00	Runarnd		
	0.0		0 0.0	0.0	Exhaust	0		200		% OA	0.0	Fn MtrT		
lumidif			v v.v	V.V	LAHAUSL	V		v	nry	∵o un	v.v	1 16 11 64 1	. v.v	, 0.0
lumidif Opt Vent	0.0		0 0.0	0.0	Rm Exh	0		0	Ц÷а	Cfm/SqFt	1.60	Fn BldT	D 0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

------ BUILDING U-VALUES------

						m U-Val /hr/sqf					Room Mass	Room Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	1ST FL APT'S	0.000	0.000	0.000	0.000	0.000	0.700	0.720	0.222	0.549	41.5	8.77
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.700	0.720	0.222	0.549	41.5	8.77
2	2ND FL APT'S	0.000	0.000	0.000	0.000	0.058	0.700	0.720	0.222	0.000	40.3	12.01
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.058	0.700	0.720	0.222	0.000	40.3	12.01
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.700	0.720	0.222	0.549	40.9	10.44
. 3	LAUNDRY ROOM	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.222	0.549	95.3	20.71
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.222	0.549	95.3	20.71
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.222	0.549	95.3	20.71
4	MECH ROOM	0.000	0.000	0.000	0.000	0.414	1.040	1.086	0.257	0.000	123.1	27.06
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.414	1.040	1.086	0.257	0.000	123.1	27.06
System	<pre>3 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.414	1.040	1.086	0.257	0.000	123.1	27.06
Buildin	g	0.000	0.000	0.000	0.000	0.072	0.705	0.726	0.224	0.549	43.2	10.90

BUILDING AREAS - ALTERNATIVE 1 BASE BUILDING

------ BUILDING AREAS -----

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	1ST FL APT'S	1	1	3,791	3,791	0	0	0	0	0	336	16	1,728
Zone	1 Total/Ave.			•	3,791	0	0	0	0	0	336	16	1,728
2	2ND FL APT'S	1	1	4,046	4,046	0	0	0	0	4,046	435	17	2,166
Zone :	2 Total/Ave.			•	4,046	0	0	0	0	4,046	435	17	2,166
System	1 Total/Ave.				7,837	0	. 0	0	0	4,046	771	17	3,894
3	LAUNDRY ROOM	1	1	88	88	0	0	0	0	0	4	2	140
Zone	3 Total/Ave.				88	0	0	0	0	0	4	2	140
System	2 Total/Ave.				88	0	0	0	0	. 0	4	2	140
4	MECH ROOM	1	1	167	167	0	0	0	0	167	8	3	<b>28</b> 9
Zone :	4 Total/Ave.	_			167	0	0	0	0	167	8	3	<b>28</b> 9
System	3 Total/Ave.				167	0	0	0	0	167	8	3	<b>28</b> 9
Buildin	· ·				8,092	0	0	0	0	4,213	783	15	<b>4,32</b> 3

ASHRAE 90 ANALYSIS - ALTERNATIVE 1 BASE BUILDING

----- ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.072 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.298 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.196 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 4.77 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 20.63 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

## System Totals

Percent	Cool	ing Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.8	16	164	-16,466	5	252	601.2	0	0	0.0	0	0
5 - 10	1.6	7	69	-32,933	5	254	1,202.3	0	0	0.0	0	. 0
10 - 15	2.4	7	74	-49,399	15	682	1,803.5	0	0	0.0	0	0
15 - 20	3.2	6	61	-65,865	34	1,582	2,404.6	42	3,650	0.0	0	0
20 - 25	4.0	7	72	-82,332	3	147	3,005.8	0	0	0.0	0	0
25 - 30	4.8	18	190	-98,798	9	398	3,606.9	0	0	0.0	0	0
30 - 35	5.6	10	104	-115,264	5	242	4,208.1	0	0	0.0	0	0
35 -  40	6.4	16	166	-131,731	2	113	4,809.2	0	0	0.0	0	0
40 - 45	7.2	5	53	-148,197	5	245	5,410.4	0	0	0.0	0	0
45 - 50	8.0	2	20	-164,663	8	355	6,011.6	21	1,825	0.0	0	0
50 - 55	8.8	2	20	-181,130	1	39	6,612.7	0	0	0.0	0	0
55 - 60	9.6	2	20	-197,596	1	29	7,213.9	0	0	0.0	0	0
60 - 165	10.4	0	0	-214,062	1	31	7,815.0	0	0	0.0	0	0
65 - 70	11.3	0	0	-230,529	6	255	8,416.2	0	0	0.0	0	0
70 - 75	12.1	0	0	-246,995	0.	0	9,017.3	0	0	0.0	. 0	0
75 - 180	12.9	0	0	-263,461	0	0	9,618.5	0	0	0.0	0	0
80 - 85	13.7	2	20	-279,928	0	0	10,219.7	0	0	0.0	0	0
85 - 190	14.5	1	11	-296,394	0	0	10,820.8	0	0	0.0	0	0
90 - <sup>1</sup> 95	15.3	0	0	-312,860	0	0	11,422.0	0	0	0.0	0	0
95 - 100	16.1	0	0	-329,327	. 0	0	12,023.1	38	3,285	0.0	0	0
Hours Off	0.0	0	7,716	0	0	4,136	0.0	0	0	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
BASE BUILDING

				(	BUILDING TEMPERATURE PROFILES
Temperature					Zone Number
Range (F)	1	2	3	4	Lone Admost
Max. Temp.	80.1	80.4	103.8	96.5	
Mo./Hr.			8 23		
Day Type	1	1			
Above 100	0	0	918	0	
95 - 100	0	-	1,117		
90 - 95	0	0			
85 - 90	0	0		1,190	
80 - 85	0	0			
75 - 80	2,893	2.942			
70 - 75	779	730			
65 - 70			4,606		
60 - 65	195	328			
55 - 60	0	0			
50:- 55	0	0	0		
8elow 50	0	0		3,033	
i					
Min. Temp.	63.9	63.4	67.9	31.7	
Mo./Hr.			3 24		
Day Type	2	3		5	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	2,632	8	862	2
Feb	2,378	8	819	2
March	2,659	8	555	2
April	2,541	8	212	1
May	2,640	9	0	0
June	2,896	9	0	0
July	3,123	9	0	0
Aug	2,993	9	0	0
Sept	2,537	9	. 0	0
Oct	2,643	8	191	1
Nov	2,543	8	418	1
Dec	2,619	8	745	2
Total	32,204	9	3,801	2

Building Energy Consumption = 60,554 (Btu/Sq Ft/Year) Source Energy Consumption = 103,381 (Btu/Sq Ft/Year)

floor Area = 8,092 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- EQUIPMENT ENERGY CONSUMPTION------EQUIPMENT

									umption		_				
ELEC 1072 968 1098 1033 1085 1060 1056 1098 1033 1085 1033 1058 12,68 PK 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1	JM	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Tota]
PK	0											4005	1077	1050	10 (0
MISC LD															
ELEC		PK	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4
PK	1														
## A COLOR CONDENSER FAMS    ELEC															
GRS		PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
QK         0.0	2	MISC LD													
3 MISC LD  011		GAS													
OIL		ŖΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	3														
# MISC LD  # STEAM		•													
P   STEAM		PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
PK	4														
5 MISC LD P HOTH2D O O O O O O O O O O O O O O O O O O O		i					0 .								
P HOTH20		PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	5	i													
5 MISC LD P CHILL O O O O O O O O O O O O O O O O O O O		A CONTRACTOR OF THE CONTRACTOR					0								
P CHILL		PK 	0.0	0.0	0.0	0.0	. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	6		۸	٨	۸.		۸	۸	۸	۸	۸	۸	۸	۸	
1 EQ1161															
ELEC		r N	0.0					۷.۷	V. V	0.0	V.0	V.V	0.0	0.0	<b>V.</b>
PK 0.0 0.0 0.0 0.0 0.0 0.7 0.8 0.8 0.8 0.8 0.0 0.0 0.0 0.0 0.1 EQ5200 CONDENSER FANS ELEC 0 0 0 0 0 0 0 0 1 0.1 0.1 0.1 0.1 0.0 0.0	1		^					224	777	225	۸	۸	۸	٥	70
1 EQ5200															
ELEC 0 0 0 0 0 0 22 34 22 0 0 0 0 0 0 7 PK 0.0 0.0 0.0 0.0 0.1 0.1 0.1 0.1 0.1 0.1			0.0	0.0	0.0	0.0	0.7	٠.٠ .	V.U	٧.٥	V.0	٧.٧	0.0	V.V	V.1
PK 0.0 0.0 0.0 0.0 0.1 0.1 0.1 0.1 0.1 0.0 0.0	1		^				۸	22	7 /	22	٥		٥	٨	7
1 EQ5303															
ELEC 0 0 0 0 0 0 90 140 93 0 0 0 0 0 32 PK 0.0 0.0 0.0 0.0 0.0 0.3 0.3 0.3 0.3 0.3		FN	V.V	0.0	0.0	0.0	V, I	V.1	V.1	V.1	V.1	۷.0	0.0	V. 0	
PK 0.0 0.0 0.0 0.0 0.3 0.3 0.3 0.3 0.3 0.0 0.0	1					•	^	0.0	1.40	0.7	۸	۸	۸	۸	70:
1 EQ4371 FAN COIL SUPPLY FAN ELEC 1555 1404 1555 1504 1555 1504 1555 1504 1555 1504 1555 1504 1555 18,30 PK 3.7 3.7 3.7 3.7 3.7 3.7 3.7 3.7 3.7 3.7															
ELEC 1555 1404 1555 1504 1555 1504 1555 1504 1555 1504 1555 1504 1555 18,30 PK 3.7 3.7 3.7 3.7 3.7 3.7 3.7 3.7 3.7 3.7		71	0.0	0.0	0.0	0.0	0.5	V.3	0.5	0.5	0.5	0.0	0.0	v.v	υ.
PK 3.7 3.7 3.7 3.7 3.7 3.7 3.7 3.7 3.7 3.7	1										4504	1555	1501		10.70
1 EQ2102 PURCHASED DIST. HOT WATER P HOTH20 862 819 555 212 0 0 0 0 191 418 745 3,80															
P HOTH20 862 819 555 212 0 0 0 0 191 418 745 3,80		PK	3.7	3.1	3.1	3.1	3.1	3.7	3.7	3.7	3.1	3.7	3.7	3.7	3.
	1														
PK 2.2 2.2 1.6 1.0 0.0 0.0 0.0 0.0 1.0 1.4 2.2 2.															
		PK	2.2	2.2	1.6	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.4	2.2	2.

Trane Air Condi By: Trane Custo	-		Network										V 600 PAGE 12
EQUIPMENT ENERG BASE BUILDING	Y CONSUMPT.	ION - AL	TERNATIV	E 1									
ELEC	6	5	6	4	0	0	0	0	0	3	5	6	34
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
BASE BUILDING

U T I L I T Y P E	AK CHEO	KSUM
Utility ELECTRIC DEMAND		
Peak Value 9.0 (kW) Yearly Time of Peak 16 (hr) 7 (mo)		
Hour 16 Month 7		
Eqp. Ref. Equipment Num. Code Name Equipment Description	Utility Demand (kW)	
Cooling Equipment		
1 EDU161 ATR-CLD COMP KIS TONS	1.2	13.53
Sub T∱tal	1.2	13.53
Sub Total	0.0	0.00
Oir Moving Equipment		
1 SUMMATION OF FAN ELECTRICAL DEMAND	3.7	41.37
Sub Total	3.7	41.37
Sub Total	0.0	0.00
Miscellaneous		
Lights Base Utilities Misc Equipment Sub Total		45.10 0.00 0.00 45.10
Grand Total	9.0	100.00

\* \* ANALYSIS \*\* TRACE 600 \*\* \*\* \*\* by \* \*

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 40

Weather File Code: CARLISLE ENERGY SAVINGS OPPORTUNITY STUDY Location: 40.2 (deq)

Latitude: 77.2 (deg) Longitude: 5 Time Zone: 475 (ft) Elevation:

29.2 (in. Hg) Barometric Pressure:

Summer Clearness Number: 1.00 1.00 Winter Clearness Number: 92 (F) Summer Design Dry Bulb: 72 (F) Summer Design Wet Bulb: Winter Design Dry Bulb: 4 (F) 0.20 Summer Ground Relectance: 0.20 Winter Ground Relectance:

0.0742 (Lbm/cuft) Air Density: 0.2444 (Btu/lbm/F) Air Specific Heat:

1.0882 (Btu-min./hr/cuft/F) Density-Specific Heat Prod: 4,790.2 (Btu-min./hr/cuft) Latent Heat Factor: 4.4519 (Lb-min./hr/cuft) Enthalpy Factor:

To September Design Simulation Period: May System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

15: 5:24 1/11/94 Time/Date Program was Run: CB40 .TM Dataset Name:

AIRFLOW - ALTERNATIVE 2 WALL & ROOF INSULATION

> ----- SYSTEM SUMMARY -----(Design Airflow Quantities)

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	FC	1,763	11,755	11,755	13,015	3,023	0	0
2	RAD	0	. 0	0	- 0	39	0	0
3	UH	0	0	248	. 0	80	0	0
Totals		1,763	11,755	12,003	13,015	3,142	0	0

CAPACITY - ALTERNATIVE 2 WALL & ROOF INSULATION

> (Design Capacity Quantities)

		Main Sys.		rrng	Cooling	Main Sys.		Preheat	Heating Reheat		Opt. Vent	Heating
System Number	_	Capacity			Totals (Tons)	Capacity (Btuh)	Capacity (8tuh)	Capacity (8tuh)	Capacity (Btuh)	Capacity (Btuh)		Totals (Btuh)
Ì	FC	12.2	0.0	0.0	12.2	-153,286	0	-117,686	0	0	. 0	-153,286
2	RAD	0.0	0.0	0.0	0.0	-3,455	0	0	0	0	0	-3,455
3	UH	0.0	0.0	0.0	0.0	-15,357	0	0	0	0	0	-15,357
Totals		12.2	0.0	0.0	12.2	-172,098	0	-117,686	0	0	0	-172,098

The building peaked at hour 16 month 7 with a capacity of 12.2 tons

ENGINEERING CHECKS - ALTERNATIVE 2

WALL & ROOF INSULATION

-----ENGINEERING CHECKS

1			Percent		Cool:	ing	Heat			
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	8tuh/ Sq Ft	Floor Area Sq Ft
i	Main	FC	15.00	1.50	961.7	641.1	18.72	1.50	-19.56	7,837
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-39.26	88
3	Main	UH	0.00	0.00	0.0	0.0	0.00	1.48	-91.96	167

System 1 Block FC - FAN COIL

	******** at Time =:		OOLING COIL Mo/Hr:	PEAK ****	*******	******							*****
	Air ==>		•	7/16 91/ 73/ 98.4	n			•	7/17 × 89 ×		mo/nr: OADB:	13/1	
0005100	1141	011	007 HO7 HK.	717 707 70.	V		*	nuu.	· ·	· t	טחט.		4 . 4
		Space	Ret. Air	Ret: Air	Net	Percnt	* S	pace	Percnt *	Space P	eak Coi	l Peak	Percnt
	5	Sens.+Lat.	Sensible		Total			ible	Of Tot *	•		t Sens	Of Tot
Envelop		(Btuh)	(Btuh)		(Btuh)			tuh)	(%)			(Btuh)	(\$)
	te Solr	Ó	Ò		0		•	0	0.00 *		0	0	0.00
	te Cond	0	0		0			0	0.00 *		0	Ō	0.00
Roof		9,789	0		9,789			,710	11.15 *		529 -	10,529	7.12
Glass	Solar	33,171	. 0		33,171			,692	38.19 *	•	0	0	0.00
Glass	Cond	7,452	0		7,452			,128	7.42 *		586 -	35,586	24.08
Wall (	Cond	5,614	276		5,891			,016	6.26 *			13,955	9.44
Parti	tion	0			0			0	0.00 *		0	0	0.00
Expos	ed Floor	0			0	0.00	*	0	0.00 *		0	0	0.00
Infil <sup>4</sup>	tration	29,812			29,812	20.32	* 19	,463	20.26 *	-87,	722 -	87,722	59.36
Sub To	otal==>	85,839	276		86,115	58.71		,010	83.28 *	•		47,792	100.00
Internal	l Loads						*		*			•	
Lights	S	10,699	0		10,699	7.29	* 10	,967	11.41 *		0	0	0.00
People	е	7,388			7,388		* 3	,818	3.97 *		0	0	0.00
Misc		0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
Sub To	otal::>	18,087	0	0	18,087	12.33	* 14	,785	15.39 *		0	0	0.00
Ceiling	Load	1,394	-1,394		0	0.00	* 1	,280	1.33 *	-1,5	549	0	0.00
Outside	Air	0	0	0	41,263	28.13	*	0	0.00 *		0	0	0.00
Sup. Far	n Heat				2,508	1.71	*		0.00 *			0	0.00
Ret. Far	n Heat		0		0	0.00			0.00 *			0	0.00
Duct Hea			0		0	0.00	*		0.00 *			0	0.00
OV/UNDR	Sizing	0			0	0.00	*	0	0.00 *		0	0	0.00
Exhaust	Heat		-1,284	0	-1,284	-0.88	*		0.00 *			0	0.00
Terminal	l Bypass		0	. 0	0	-0.00	*		0.00 *			0	0.00
1							*		*				
Grand To	otal==>	105,320	-2,402	0	146,688	100.00	* 96	,074	100.00 *	-148,6	583 -1	47,792	100.00
			C00L	ING COIL SE	LECTION						AREA	s	
1	Total	Capacity	Sens Cap.	Coil Airfl	Enteri	ng DB/WB/H	R Leav	∕ing D8	3/WB/HR	Gross Tot	al G	lass (st	*) (\$)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg	g F Grain	s Deg F	Deg F	Grains	Floor	7,837	·	
Main Clg	12.2	146.7		11,755			8 67.4	64.4	88.5	Part	0		
Aux Clg	0.0	0.0	0.0	0		).0 0.		0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Roof	4,046		0 0
Totals	12.2	146.7								Wall	4,665	7	71 17
	HEATIN	G COIL <b>SE</b> LE	CTION		AIR	RFLOWS (cf	m)	8	NGINEERING	CHECKS	TEMP	ERATURES	(F)
!	Capacit	y Coil Ai	rfl Ent	Lvg	Type	Cooling	Heating	Clg	1 % OA	15.0	Type	Clg	Htg
	(Mbh)	(cfm	n) Deg F	Deg F	Vent	1,763	0	Clg	Cfm/Sqft	1.50	SADB	67.5	-
Main Htg	-153.	3 11,7	55 67.6	79.6	Infil	1,260	1,260	Clg	Cfm/Ton	961.67	Plenum	75.7	67.3
Aux Htg	0.	0	0.0	0.0	Supply	11,755	11,755	Clg	Sqft/Ton	641.11	Return	75.7	67.6
Preheat	-117.	7 11,7	55 58.1	67.3	Mincfm	0	0	Clg	Btuh/Sqft	18.72	Ret/OA	77.9	67.6
Reheat	0.		0.0	0.0	Return	11,755	11,755	No.	People	20	Runarn	d 75.0	
Humidif	0.		0.0	0.0	Exhaust	1,763	0	Htg	1 % OA	0.0	Fn Mtr	TD 0.0	
Opt Vent	0.		0.0		Rm Exh	0	0	Htg	Cfm/SqFt	1.50	Fn Bld	TD <b>0</b> ,0	0.0
Total i	-153.	7			Auxil	0	0		Btuh/SqFt	-19.56	Fn Fri		0.1

0.0 68.0

0.0

0.0

0.0

0.0

0

O No. People

O Htg % OA O Htg Cfm/SqFt

0 Htg Cfm/Sqrı 0 Htg Btuh/SqFt -39.26

Runarnd

Fn BldTD

Fn Frict 0.0

0.0 Fn MtrTD

0.0

0.0

0.0

-3.5

Reheat

Humidif

Opt Vent

Total

0

0

0

0.0

0.0

0.0

0.0

0.0

0.0

Return

Exhaust

Rm Exh

Auxil

0

0

System 2 Block RAD - RADIATION Peaked at Time ==> Mo/Hr: 0/0 \* Mo/Hr: 13/1 OADB: 4 OADB: 0 OADB/WB/HR: O/ O/ 0.0 Outside Air ==> Percnt \* Space Peak Coil Peak Percnt Net Percnt \* Space Ret. Air Ret. Air Space Total Of Tot \* Sensible Of Tot \* Space Sens Tot Sens Sensible Latent Sens.+Lat. (%) \* (Btuh) (%) (Btuh) (Btuh) (Btuh) (%) \* (Btuh) (Btuh) (Btuh) Envelope Loads 0 0 0.00 \* 0 0.00 0 0.00 \* 0 0 Skylite Solr 0 0 0.00 0.00 \* 0 0 0.00 \* 0 0 Skylite Cond 0 0 0 0.00 0.00 \* 0 0.00 \* 0 Roof Cond 0 0.00 \* 0 0 0.00 -0 0.00 \* 0 0 Glass Solar . 0 -244 7.06 0.00 \* -244 . 0 0 0.00 \* Glass Cond -457 -503 14.56 0 0.00 \* 0 0.00 \* 0 Wall Cond 0 0.00 0.00 \* 0 0 0 0.00 \* 0 Partition 0 0.00 0 0.00 \* 0 0.00 \* Exposed Floor 0 -2,708 -2,708 78.38 -3,409 -3,455 100.00 0.00 \* 0 0.00 \* Infiltration 0 0.00 \* 0 0.00 \* 0 Sub Total==> 0 0 Internal Loads 0 0 0.00 0 0.00 \* 0 0.00 \* 0 Lights 0 0.00 \* 0 0.00 0 0.00 \* 0 People 0 0 0.00 \* 0 0.00 \* 0 Misc 0 0 0 0.00 \* 0.00 \* 0.00 0 . 0 Sub Total==> 0.00 \* 0.00 -46 0 0.00 \* Ceiling Load 0 0 0.00 0.00 \* 0.00 \* Outside Air 0 0 Λ 0 0.00 \* 0.00 \* Sup. Fan Heat 0 0.00 \* 0 0.00 0.00 \* 0 Ret. Fan Heat 0.00 \* 0.00 0 0.00 \* Duct Heat Pkup 0.00 \* 0.00 0.00 \* OV/UNDR Sizing 0.00 0.00 \* 0 0.00 \* Exhaust Heat 0 0 0.00 0.00 \* 0 0.00 \* 0 Terminal Bypass 0.00 \* 0.00 \* -3,455 -3,455 100.00 0 Grand Total==> Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 88 0 0.0 0.0 0.0 0.0 0.0 0.0 Part 0 0.0 0.0 0.0 Main Clq 0.0 0.0 0.0 0.0 0.0 0 0.0 0.0 0.0 ExFlr 0.0 Aux Clg 0.0 0 0.0 0.0 0.0 0.0 0.0 Roof ٥ 0.0 0.0 Opt Vent 0.0 Wall 144 0.0 Totals 0.0 Type Cooling Heating Type Cla Htg Clg % 0A 0.0 Capacity Coil Airfl Ent Lvg 0.0 68.1 0.00 SADB (cfm) Deg F Deg F Vent 0. 0 Clg Cfm/Sqft (Mbh) 0 39 Clg Cfm/Ton 0.00 Plenum 0.0 67.1 -3.5 0 0.0 0.0 Infil Main Htg 0.0 67.1 0 0.00 Return 0 0 Clg Sqft/Ton 0.0 0.0 Supply 0.0 Aux Hta 0 0.00 0.0 67.1 O Clg Btuh/Saft Ret/OA 0.0 0 0.0 0.0 Mincfm Preheat

System 3 Block UH - UNIT HEATERS

Peaked a	********* at Time ==: Air ==>	>	OOLING COIL Mo/Hr: DB/WB/HR:			******	***** * *	Mo	SPACE /Hr: (			TING COIL Mo/Hr: 1 OADB:	3/ 1	******
							*			*		•	•	
	6.	Space	Ret. Air			et Percn			pace	Percnt *				Percnt
Envelope		ens.+Lat. (Btuh)	Sensible (Btuh)		Tota (Btul			Sens (p	tuh)	Of Tot * (%) *			tuh)	Of Tot
•	te Solr	(61411)	(6,011)	(orun)	(010)	0.0		(0	0	0.00 *	-	0	0	( <b>\$</b> ) 0.00
	te Cond	0	0			0 0.0			0	0.00 *		0	0	0.00
Roof C		0	0			0 0.0			0	0.00 *		-	,428	28.83
Glass		0	. 0			-0 0.0			Õ	0.00 *		0	0	0.00
Glass		0	0			0.0			0	0.00 *		-	-573	3.73
Wall C		0	0		-	0 0.0			Ō	0.00 *			,762	31.01
Partit		0	•			0 0.0			0	0.00 *	•	0	0	0.00
	ed Floor	0				0 0.0			0	0.00 *		0	0	0.00
•	tration	0				0 0.0			0	0.00 *		94 -5	,594	36.43
	otal:=>	0	0	•		0 0.0			0	0.00 *	•		,357	100.00
Internal							*			*	•		,	3
Lights		0	0			0 0.0	0 *		0	0.00 *		0	0	0.00
People		0				0.0			0	0.00 *		0	0	0.00
Mis¢		0	0	0		0.0			0	0.00 *		0	0	0.00
Sub To	otal==>	0	0	0		0 0.0	0 *		0	0.00 *		0	0	0.00
Ceiling	Load	0	0			0.0	0 *		0	0.00 *		0	0	0.00
Outside	Air	0	0	0		0.0	) *		0	0.00 *		0	0	0.00
Sup. Fan	n Heat					0 0.0	0 *			0.00 *			0	0.00
Ret. Fan	n Heat		0		•	0.0	) *			0.00 *			0	0.00
Duct Hea	at Pkup		0			0.0	0 *			0.00 *			0	0.00
OV/UNDR		0					) *		0	0.00 *		0	0	0.00
Exhaust			0	0			0 *			0.00 *			0	0.00
Terminal	. Bypass		0	0		0.0				0.00 *			0	0.00
		_			•		*		•	*		4-	***	400.00
Grand To	tal==>	0	0	0		0 0.00	) *		0	0.00 *	-15,3	5/ -15	,357	100.00
			coo	ING COIL S	ELECTION							AREAS-		
	Total C	Capacity	Sens Cap.	Coil Airfl	Enter	ing DB/W	3/HR	Leav	ving D8	/WB/HR	Gross Tota	al Gla	ss (sf	) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F D	eg F Gr	ains	Deg F	Deg F	Grains	Floor	167		
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0		
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	. 0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	167		0 0
Totals	0.0	0.0								•	Wall	297		8 3
	HEATING	COIL SELE	ECTION		A	IRFLOWS	(cfm)-		E	NGINEERING	CHECKS	TEMPER	ATURES	(F)
:	Capacity				Type	Cooling		Heating		% 0A	0.0	Type	Clg	Htg
	(Mbh)			Deg F	Vent		)	0		Cfm/Sqft	0.00	SAD8		125.0
Main Hťg	-15.4		248 68.0	125.0	Infil	(	)	80		Cfm/Ton		Plenum	0.0	
Aux Htg	0.0	1	0.0	0.0	Supply	(	)	248		Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0		0.0	0.0	Mincfm		)	0		Btuh/Saft		Ret/OA	0.0	
Reheat	0.0	)	0.0	0.0	Return	(	)	248	No.	People	0	Runarnd	0.0	68.0
Humidif	0.0	)	0.0	0.0	Exhaust	(	)	0	Htg	% 0A	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0		0.0	0.0	Rm Exh	(	)	0		Cfm/SqFt	1.48	Fn BldTD	0.0	0.0
Total	-15.4				Auxil	(	)	0	Htg	Btuh/SqFt	-91.96	Fn Frict	0.1	0.0

BUILDING U-VALUES - ALTERNATIVE 2 WALL & ROOF INSULATION

----- BUILDING U-VALUES-----

						m U-Val /hr/sqf					Room Mass	Room Capac.
Room Number	Description	Part.	ExFlr	Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.	(lb/ sqft)	(Btu/ sqft/F)
				•	·			. 700	0.05/	0.540	41.0	0.07
1	1ST FL APT'S	0.000	0.000	0.000	0.000	0.000	0.700	0.720	0.056	0.549	41.8	8.83
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.700	0.720	0.056	0.549	41.8	8.83
2	2ND FL APT'S	0.000	0.000	0.000	0.000	0.041	0.700	0.720	0.056	0.000	42.9	12.53
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.700	0.720	0.056	0.000	42.9	12.53
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	0.700	0.720	0.056	0.549	42.4	10.74
3	LAUNDRY ROOM	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.056	0.549	96.4	20.92
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.056	0.549	96.4	20.92
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.056	0.549	96.4	20.92
4	MECH ROOM	0.000	0.000	0.000	0.000	0.414	1.040	1.086	0.257	0.000	123.1	27.06
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.414	1.040	1.086	0.257	0.000	123.1	27.06
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.414	1.040	1.086	0.257	0.000	123.1	27.06
Buildin	•	0.000	0.000	0.000	0.000	0.055	0.705	0.726	0.069	0.549	44.6	11.19

BUILDING AREAS - ALTERNATIVE 2
WALL & ROOF INSULATION

------ 8 U I L D I N G A R E A S -----

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
i	1ST FL APT'S	1	1	3,791	3,791	0	0	0	0	0	336	16	1,728
Zone :	1 Total/Ave.			,	3,791	0	0	0	0	0	336	16	1,728
2	2ND FL APT'S	1	1	4,046	4,046	0	0	0	0	4,046	435	17	2,166
Zone	2 Total/Ave.			,	4,046	. 0	0	0	0	4,046	435	17	2,166
System	1 Total/Ave.				7,837	0	0	0	0	4,046	771	17	3,894
3	LAUNDRY ROOM	1	1	88	. 88	0	0	0	0	0	4	2	140
Zone	3 Total/Ave.	_			88	. 0	0	0	0	0	4	2	140
System	2 Total/Ave.				88	0	. 0	0	0	0	4	2	140
4	MECH ROOM	1	1	167	167	0	0	0	0	167	8	3	<b>28</b> 9
Zone i	4 Total/Ave.	_	_		167	0	0	0	0	167	8	3	<b>28</b> 9
System	3 Total/Ave.				167	0	0	0	0	167	8	3	<b>28</b> 9
Buildir	•				8,092	0	0	0	0	4,213	783	15	4,323

ASHRAE 90 ANALYSIS - ALTERNATIVE 2 WALL & ROOF INSULATION

------ ASHRAE 90 ANALYSIS------

Overall Roof U-Value = 0.055 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.167 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.117 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 16.32 (Btu/Hr/Sq Ft) SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 WALL & ROOF INSULATION

## System Totals

Percent	Cool	ling Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design Load	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.6	10	100	-14,489	7	331	600.2	. 0	0	0.0	0	٥
5 - 10	1.2	10	103	-28,978	7	334	1,200.3	۸	٥	0.0	Ô	0
10 - 15	1.2	6	62	-43,468	37	1,667	1,800.5	0	٥	0.0	ň	ñ
		0	50	-57,957	9	411	2,400.6	42	3,650	0.0	۸	0
13 20	2.4	0					3,000.8	0	3,030	0.0	0	۸
20 - 25	3.1	8	81	-72,446	6	265 421		۸	0	0.0	۸	0
25 - 30	3.7	18	178	-86,935	9		3,600.9	0	0		۸	٥
30 - 35	4.3	9	92	-101,424	4	178	4,201.1	0	U	0.0	0	0
35 - '40	4.9	11	114	-115,914	2	102	4,801.2	0	0	0.0	0	0
40 ~ 45	5.5	14	143	-130,403	8	374	5,401.4	0	0	0.0	0	0
45 - 50	6.1	2	20	-144,892	2	101	6,001.5	21	1,825	0.0	0	0
50 - 55	6.7	. 2	20	-159,381	6	276	6,601.7	0	0	0.0	0	0
55 - 60	7.3	2	20	-173,870	0	0	7,201.8	0	0	0.0	0	0
60 - 65	7.9	0	0	-188,359	0	0	7,802.0	0	0	0.0	0	0
65 - 70	8.6	0	0	-202,849	0	0	8,402.2	0	0	0.0	0	0
70 - 75	9.2	2	20	-217,338	0	0	9,002.3	0	0	0.0	0	0
75 - 80	9.8	1	11	-231,827	0	0	9,602.5	0	0	0.0	0	0
80 - 85	10.4	0	0	-246,316	0	0	10,202.6	0	0	0.0	0	0
85 - <sup>1</sup> 90	11.0	Ô	0	-260,805	0	0	10,802.8	0	0	0.0	0	0
90 - 95	11.6	٥	Ô	-275,295	0	Ô	11,402.9	0	0	0.0	Ó	Ô
95 - 100	12.2	۸	0	-289,784	n	0	12,003.1	38	3,285	0.0	n	0
Hours Off	0.0	0	7,746	207,704	ő	4,300	0.0	0	0	0.0	Ŏ	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 WALL & ROOF INSULATION

!		~ ~ ~ ~ ~			UILDIN	G TEM	PERAT	UREP	ROFIL	E \$	 		
Temperature							Zon	e Number -	• • • • • • • • • • • • • • • • • • • •		 		
Range (F)	1	2	: 3	5 4								,	
Max. Temp.	79.6	79.5	123.3	96.5									
Mo./Hr.	7 14	7 14	9 23	7 21									
Day Type	1	1	· 1	1		-							
						<i></i>	Numbe	r of Hours			 		
Above 100	0	0	2,676	0									
95 - 100	0	0	286	30									
90 - 95	0	0	216	864									
85 - 90	0	. 0	422	1,190	•								
80 - 85	0	0	311	597									
75 - 80	2,989	3,054	415	961									
70 - 75	683	635	90	30									
65 - 70	5,088	5,015	4,344	85									
60 - 65	0	56	0	733									
55: - 60	0	0	0	710									
50 <sup>1</sup> - 55	0	0	0	537									
Below 50	0	0	0	3,023		•							
Min. Temp.	65.2	64.7	67.9	32.1									
Mo./Hr.	2 15			2 10									
Day Type	2	3	1	5									

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan ,	2,631	8	635	2
Feb	2,377	8	607	2
March	2,658	8	405	1
April	2,540	8	141	_ 1
May	2,640	8	. 0	0
June	2,865	9	0	0
July	3,120	9	0	0
Aug	2,989	9	. 0	0
Sept	2,537	9	0	0
Oct i	2,642	8	105	1
Nov	2,542	8	297	1
Dec	2,618	8	543	2
Total	32,160	9	2,732	2

Building Energy Consumption = 47,328 (Btu/Sq Ft/Year)
Source Energy Consumption = 85,715 (Btu/Sq Ft/Year)

Floor Area =

8,092 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

----- EQUIPMENT ENERGY CONSUMPTION -----

					•									
Ref Num	Equip - Code	Jan	Feb	Mar	Apr	May	thly Cons June	umption July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS													
	ELEC PK	1072 4.1	968 4.1	1098 4.1	1033 4.1	1085 4.1	1060 - <b>4.1</b>	1058 <b>4.</b> 1	1098 <b>4.1</b>	1033 4.1	1085 4.1	1033 4.1	1058 4.1	12,683 4.1
1	MISC LD								•					•
-	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD			_				•						•
	GAS	0 0.0	0.0	0.0	0 0.0	0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0
	PΚ	V.U	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD OIL	0	0	0	0	0	0	0	0	0	0	0	0	. 0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD P HOTH20	۸	۸	۸		۸	۸	٥	0	۸	۸	۸	۸	0
	P NUINZU PK	0 0.0	0.0	0 0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0.0
	ļ	•••	•••	•••	,								•••	
6	MISC LD	۸	۸	۸	۸ .		٥	۸	٥	٨	۸	۸	٨	۸
	P CHILL PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0.0
	•	***											•••	
1	EQ1161	٥		CLD COND			200	334	221	۸	٥	۸	٥	754
	ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0.8	0.8	0.8	0 0.8	0.0	0 0.0	0.0	0.8
		•••												
1	EQ5200	۸	COND 0	ENSER FA		٨	20	34	22	۸	٨	٨	۸	76
	ELEC PK	0.0	0.0	0 0.0	0 0.0	0 0.0	0.1	0.1	0.1	0 0.1	0.0	0.0	0 0.0	0.1
		, 555												
1	EQ5303			ROLS	۸	۰	01	1.46	0.7	٥	٥	٥	٥	717
	ELEC Pk	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	81 0.3	140 0.3	93 0.3	0 0.3	0.0	0.0	0 0.0	313 0.3
	i i	V.V	V.V	0.0	0.0	0.0	V.0	0.0	0.0	0.0	٧.٠	0.0	<b>V.</b> 0	
1	EQ4371			COIL SUP								4.5.		40.004
	ELEC	1555 3.7	1404 3.7	1555 3.7	1504 3.7	1555 3.7	1504 3.7	1555 3.7	1555 3.7	1504 3.7	1555 3.7	1504 <b>3.</b> 7	1555 3.7	18,304 3.7
	PK	3.1	3.7	3.7	3.7	3.7	3.1	3.7	3.7	3.1	3.7	3.7	3.7	3.7
1	EQ2102			HASED DI										
	P HOTH20	635	607	405	141	0	0	0	. 0	0	105	297	543	2,732
	PK	1.5	1.5	1.3	0.8	0.0	0.0	0.0	0.0	0.0	0.8	1.1	1.5	1.5
1	E05020		HEAT	WATER C	IRC. PUM	IP C.V.					1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -			

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

5 0.0 ELEC 4 0.0 3 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 ₽K 0.0 0.0 0.0 0.0

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UTILITY PEAK CHECKSUMS - ALTERNATIVE 2 WALL & ROOF INSULATION

Lights Base Utilities

Sub Total

Grand Total

Misc Equipment

WHEE & ROOT 2,100EH 10H				
		-UTILITY PEA	KCHEC	KSUMS
Utility ELECTRIC DEMA	AND			÷
Peak Value 9.0 Yearly Time of Peak 16	• •			
Hour 16 Month 7				
Eqp. : Ref. Equipment Num. Code Name		- Equipment Description	Utility Demand (k\)	Percnt Of Tot (%)
Cooling Equipment				
1 EQ1161	AIR-CLD COND COMP	<15 TONS	1.2	13.53
Sub Total			1.2	13.53
Sub Total			0.0	0.00
Air Moving Equipment				
1	SUMMATION OF FAN E	ELECTRICAL DEMAND	3.7	41.37
Sub Total			3.7	41.37
Sub Total			0.0	0.00
Miscellaneous				

45.10

0.00

0.00

45.10

9.0 100.00

0.0

0.0

Building 045
Trace Input File

```
CONTENTS OF : E:\CB45.TM
LINE #
   1
       JOB - 1
       01/ENERGY SAVINGS OPPORTUNITY STUDY
   2
   3
       01/CARLISLE BARRACKS, PA
   4
       01/DEPARTMENT OF THE ARMY
   5
       01/BENATEC ASSOCIATES
       01/BUILDING 45
   6
   7
       08/CARLISLE
       09/MAY/SEP///APR/OCT
   8
   9
       10/CLTD-CLF
  10
       11///ZONE
  11
       LOAD - 1
       19/1/BASE BUILDING
  12
       20/1/1/OFFICES/4954/1/1/0//9
 13
 14
       20/2/2/CORRIDOR TOILETS/1132/1/1/0//9
       20/3/3/WOMENS TOILET/108/1/1/0//9
 15
       21/M///CBADCTX///CBADHTX
 16
  17
       22/1/1/YES////154
       22/2/1/YES////154
 18
 19
       22/3/1/YES////154
  20
       24/1/1/100/7.3//196/18
       24/1/2/163/7.3//196/108
  21
       24/1/3/38/7.3//196/198
  22
       24/1/4/155/7.3//196/288
 23
       24/2/1/44/7.3//196/108
  24
 25
       24/2/2/39/7.3//196/198
 26
       24/2/3/64/7.3//196/288
 27
       24/3/1/12/7.3//196/108
 28
       24/3/2/9/7.3//196/198
 29
       25/1/1/94.1/1/1/.55/.57
 30
       25/1/2/175/1/1/.55/.57
 31
       25/1/3/4.25/2.25/4/.55/.57
 32
       25/1/4/166/1/1/.55/.57
 33
       25/2/1/4.25/2.25/5/.55/.57
       25/2/2/4.25/2.25/4/.55/.57
 34
       25/2/3/4.25/2.25/8/.55/.57
 35
       25/3/1/4.25/2.25/1/.55/.57
 36
 37
       25/3/2/4.25/2.25/1/.55/.57
       26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF
 38
 39
       26/2/CBADP&L/CBADP&L/OFF/OFF/OFF/OFF/OFF/OFF
 40
       26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF
       27/1/118/SF-PERS/255/255/1.67/WATT-SF
 41
 42
       27/2////1.3/WATT-SF
       27/3////1.3/WATT-SF
 43
       29/1////.36/CFM-SF/.36/CFM-SF
 44
 45
       29/2//////.36/CFM-SF
       29/3////.36/CFM-SF/.36/CFM-SF
 46
       30/1/5519/CFM
 47
       SYSTEM - 1
 48
       39/1/BASE BUILDING
 49
 50
       40/1/SZ
       41/1/1/1
 51
 52
       42/1/1
       45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 53
       40/2/PTAC
 54
       41/2/3/3
 55
 56
       42/2/.25
       45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 57
 58
       40/3/RAD
```

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CONTENTS OF : E:\CB45.TM
LINE #
       41/3/1/3
 59
       45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
 60
       EQUIPMENT - 1
 61
       59/1/CARLISLE///BASE BUILDING
  62
 63
       60/1/1/BLKPLANT/1/1
       60/2/2/BLKPLANT/2/2
 64
       62/1/EQ1161/1
 65
       62/2/EQ1161/1
 66
 67
       65/1/1//3/3
 68
       67/1/EQ2102/1
 69
       69/1/EQ4003
 70
       69/2/EQ4003
 71
       LOAD - 2
 72
       19/2/WALL & ROOF INSULATION
 73
       20/1/1/OFFICES/4954/1/1/0//9
       20/2/2/CORRIDOR TOILETS/1132/1/1/0//9
 74
 75
       20/3/3/WOMENS TOILET/108/1/1/0//9
 76
       21/M///CBADCTX///CBADHTX
 77
       22/1/1/YES////191
 78
       22/2/1/YES////191
       22/3/1/YES////191
 79
       24/1/1/100/7.3//123/18
 80
       24/1/2/163/7.3//123/108
 81
 82
       24/1/3/38/7.3//123/198
 83
       24/1/4/155/7.3//123/288
 84
       24/2/1/44/7.3//123/108
       24/2/2/39/7.3//123/198
 85
 86
       24/2/3/64/7.3//123/288
 87
       24/3/1/12/7.3//123/108
       24/3/2/9/7.3//123/198
 88
       25/1/1/94.1/1/1/.55/.57
 89
       25/1/2/175/1/1/.55/.57
 90
 91
       25/1/3/4.25/2.25/4/.55/.57
 92
       25/1/4/166/1/1/.55/.57
 93
       25/2/1/4.25/2.25/5/.55/.57
 94
       25/2/2/4.25/2.25/4/.55/.57
 95
       25/2/3/4.25/2.25/8/.55/.57
 96
       25/3/1/4.25/2.25/1/.55/.57
 97
       25/3/2/4.25/2.25/1/.55/.57
       26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF
 98
 99
       26/2/CBADP&L/CBADP&L/OFF/OFF/OFF/OFF/OFF/OFF
100
      26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF
      27/1/118/SF-PERS/255/255/1.67/WATT-SF
101
102
      27/2////1.3/WATT-SF
103
      27/3////1.3/WATT-SF
      29/1////.30/CFM-SF/.30/CFM-SF
104
      29/2/////.30/CFM-SF
105
      29/3////.30/CFM-SF/.30/CFM-SF
106
107
      30/1/5519/CFM
108
      SYSTEM - 2
109
      39/2/WALL & ROOF INSULATION
110
      40/1/SZ
111
      41/1/1/1
112
      42/1/1
113
       45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
      40/2/PTAC
114
115
      41/2/3/3
      42/2/.25
116
```

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CONTENTS OF : E:\CB45.TM
LINE #
117
       45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 118
       40/3/RAD
119
       41/3/1/3
120
       45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
121
       EQUIPMENT - 2
122
       59/2/CARLISLE///WALL & ROOF INSULATION
123
       60/1/1/BLKPLANT/1/1
124
       60/2/2/BLKPLANT/2/2
125
       62/1/EQ1161/1
126
       62/2/EQ1161/1
127
       65/1/1//3/3
128
       67/1/EQ2102/1
129
       69/1/EQ4003
130
       69/2/EQ4003
131
       LOAD - 3
       19/3/WEATHERSTRIP & CAULKING
132
133
       20/1/1/OFFICES/4954/1/1/0//9
134
       20/2/2/CORRIDOR TOILETS/1132/1/1/0//9
135
       20/3/3/WOMENS TOILET/108/1/1/0//9
       21/M///CBADCTX///CBADHTX
136
137
      22/1/1/YES////154
138
      22/2/1/YES////154
139
      22/3/1/YES////154
140
      24/1/1/100/7.3//196/18
141
      24/1/2/163/7.3//196/108
142
      24/1/3/38/7.3//196/198
143
      24/1/4/155/7.3//196/288
144
      24/2/1/44/7.3//196/108
145
      24/2/2/39/7.3//196/198
146
      24/2/3/64/7.3//196/288
147
      24/3/1/12/7.3//196/108
148
      24/3/2/9/7.3//196/198
149
      25/1/1/94.1/1/1/.55/.57
150
      .25/1/2/175/1/1/.55/.57
151
      25/1/3/4.25/2.25/4/.55/.57
      25/1/4/166/1/1/.55/.57
152
153
      25/2/1/4.25/2.25/5/.55/.57
154
      25/2/2/4.25/2.25/4/.55/.57
155
      25/2/3/4.25/2.25/8/.55/.57
156
      25/3/1/4.25/2.25/1/.55/.57
157
      25/3/2/4.25/2.25/1/.55/.57
158
      26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF
159
      26/2/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF
160
      26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF
      27/1/118/SF-PERS/255/255/1.67/WATT-SF
161
162
      27/2////1.3/WATT-SF
163
      27/3////1.3/WATT-SF
164
      29/1////.29/CFM-SF/.29/CFM-SF
165
      29/2/////.29/CFM-SF
166
      29/3////.29/CFM-SF/.29/CFM-SF
167
      30/1/5519/CFM
168
      SYSTEM - 3
169
      39/3/WEATHERSTRIP & CAULKING
170
      40/1/SZ
171
      41/1/1/1
172
      42/1/1
173
      45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF
174
      40/2/PTAC
```

```
CONTENTS OF : E:\CB45.TM
LINE #
175
       41/2/3/3
 176
       42/2/.25
177
       45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
178
       40/3/RAD
179
       41/3/1/3
180
       45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
181
       EQUIPMENT - 3
182
       59/3/CARLISLE///WEATHERSTRIP & CAULKING
183
       60/1/1/BLKPLANT/1/1
184
       60/2/2/BLKPLANT/2/2
185
       62/1/EQ1161/1
186
       62/2/EQ1161/1
187
       65/1/1//3/3
188
       67/1/EQ2102/1
       69/1/EQ4003
189
       69/2/EQ4003
190
191
       LOAD - 4
       19/4/REPLACE FLUORESCENT LAMPS
192
193
       20/1/1/OFFICES/4954/1/1/0//9
       20/2/2/CORRIDOR TOILETS/1132/1/1/0//9
194
195
       20/3/3/WOMENS TOILET/108/1/1/0//9
196
       21/M///CBADCTX///CBADHTX
197
       22/1/1/YES////154
198
       22/2/1/YES////154
199
       22/3/1/YES////154
200
       24/1/1/100/7.3//196/18
201
       24/1/2/163/7.3//196/108
202
       24/1/3/38/7.3//196/198
203
       24/1/4/155/7.3//196/288
204
       24/2/1/44/7.3//196/108
205
       24/2/2/39/7.3//196/198
       24/2/3/64/7.3//196/288
206
207
       24/3/1/12/7.3//196/108
208
       24/3/2/9/7.3//196/198
209
       25/1/1/94.1/1/1/.55/.57
       25/1/2/175/1/1/.55/.57
210
211
       25/1/3/4.25/2.25/4/.55/.57
212
       25/1/4/166/1/1/.55/.57
213
       25/2/1/4.25/2.25/5/.55/.57
214
       25/2/2/4.25/2.25/4/.55/.57
       25/2/3/4.25/2.25/8/.55/.57
215
       25/3/1/4.25/2.25/1/.55/.57
216
       25/3/2/4.25/2.25/1/.55/.57
217
       26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF
218
219
       26/2/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF
220
       26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF
       27/1/118/SF-PERS/255/255/1.46/WATT-SF
221
       27/2////1.14/WATT-SF
222
223
       27/3////.80/WATT-SF
       29/1////.36/CFM-SF/.36/CFM-SF
224
       29/2//////.36/CFM-SF
225
      29/3////.36/CFM-SF/.36/CFM-SF
226
227
      30/1/5519/CFM
228
       SYSTEM - 4
229
       39/4/REPLACE FLUORESCENT LAMPS
230
       40/1/SZ
231
       41/1/1/1
232
       42/1/1
```

```
CONTENTS OF : E:\CB45.TM
LINE #
233
      45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
234
      40/2/PTAC
235
      41/2/3/3
236
      42/2/.25
237
      45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF
238
      40/3/RAD
239
      41/3/1/3
240
      45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
241
      EQUIPMENT - 4
242
      59/4/CARLISLE///REPLACE FLUORESCENT LAMPS
      60/1/1/BLKPLANT/1/1
243
244
      60/2/2/BLKPLANT/2/2
245
      62/1/EQ1161/1
246
      62/2/EQ1161/1
247
      65/1/1//3/3
248
      67/1/EQ2102/1
249
      69/1/EQ4003
```

250

69/2/EQ4003

```
CONTENTS OF : E:\CB45B.TM
LINE # -----
  1
       J08 - 1
  2
       01/ENERGY SAVINGS OPPORTUNITY STUDY
  3
       01/CARLISLE BARRACKS. PA
  4
       01/DEPARTMENT OF THE ARMY
  5
       01/BENATEC ASSOCIATES
  6
       01/BUILDING 45
  7
       08/CARLISLE
  8
       09/MAY/SEP////APR/OCT
  9
       10/CLTD-CLF
 10
       11///ZONE
 11
       LOAD - 1
 12
       19/1/REPLACE FLUORESCENT BALLASTS
 13
       20/1/1/OFFICES/4954/1/1/0//9
 14
       20/2/2/CORRIDOR TOILETS/1132/1/1/0//9
 15
      20/3/3/WOMENS TOILET/108/1/1/0//9
 16
      21/M///CBADCTX///CBADHTX
 17
      22/1/1/YES////154
 18
      22/2/1/YES////154
 19
      22/3/1/YES////154
 20
      24/1/1/100/7.3//196/18
 21
      24/1/2/163/7.3//196/108
 22
      24/1/3/38/7.3//196/198
 23
      24/1/4/155/7.3//196/288
 24
      24/2/1/44/7.3//196/108
 25
      24/2/2/39/7.3//196/198
 26
      24/2/3/64/7.3//196/288
 27
      24/3/1/12/7.3//196/108
      24/3/2/9/7.3//196/198
 28
 29
      25/1/1/94.1/1/1/.55/.57
 30
      25/1/2/175/1/1/.55/.57
 31
      25/1/3/4.25/2.25/4/.55/.57
      25/1/4/166/1/1/.55/.57
 32
      25/2/1/4.25/2.25/5/.55/.57
 33
      25/2/2/4.25/2.25/4/.55/.57
 34
 35
      25/2/3/4.25/2.25/8/.55/.57
      25/3/1/4.25/2.25/1/.55/.57
 36
 37
      25/3/2/4.25/2.25/1/.55/.57
 38
      26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF
 39
      26/2/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF
 40
      26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF
 41
      27/1/118/SF-PERS/255/255/1.24/WATT-SF
 42
      27/2////.97/WATT-SF
 43
      27/3////.68/WATT-SF
 44
      29/1////.36/CFM-SF/.36/CFM-SF
 45
      29/2//////.36/CFM-SF
 46
      29/3////.36/CFM-SF/.36/CFM-SF
 47
      30/1/5519/CFM
 48
      SYSTEM - 1
 49
      39/1/REPLACE FLUORESCENT BALLAST
 50
      40/1/SZ
 51
      41/1/1/1
 52
      42/1/1
 53
      45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 54
      40/2/PTAC
 55
      41/2/3/3
 56
      42/2/.2
 57
      45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 58
      40/3/RAD
```

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CONTENTS OF : E:\CB45B.TM
LINE #
 59
       41/3/1/3
  60
       45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
 61
       EQUIPMENT - 1
       59/1/CARLISLE///REPLACE FLUORESCENT BALLASTS
 62
 63
       60/1/1/BLKPLANT/1/1
 64
       60/2/2/BLKPLANT/2/2
  65
       62/1/EQ1161/1
 66
       62/2/EQ1161/1
 67
       65/1/1//3/3
 68
       67/1/EQ2102/1
 69
       69/1/EQ4003
 70
       69/2/EQ4003
 71
       LOAD - 2
 72
       19/2/REPLACE FLUORESCENT FIXTURES
 73
       20/1/1/OFFICES/4954/1/1/0//9
       20/2/2/CORRIDOR TOILETS/1132/1/1/0//9
 74
 75
       20/3/3/WOMENS TOILET/108/1/1/0//9
 76
       21/M///CBADCTX///CBADHTX
 77
       22/1/1/YES////154
 78
       22/2/1/YES////154
 79
       22/3/1/YES////154
 80
       24/1/1/100/7.3//196/18
       24/1/2/163/7.3//196/108
 81
      24/1/3/38/7.3//196/198
 82
 83
      24/1/4/155/7.3//196/288
 84
      24/2/1/44/7.3//196/108
      24/2/2/39/7.3//196/198
 85
      24/2/3/64/7.3//196/288
 86
 87
      24/3/1/12/7.3//196/108
 88
      24/3/2/9/7.3//196/198
 89
      25/1/1/94.1/1/1/.55/.57
      25/1/2/175/1/1/.55/.57
 90
 91
      25/1/3/4.25/2.25/4/.55/.57
 92
      25/1/4/166/1/1/.55/.57
      25/2/1/4.25/2.25/5/.55/.57
 93
 94
      25/2/2/4.25/2.25/4/.55/.57
 95
      25/2/3/4.25/2.25/8/.55/.57
 96
      25/3/1/4.25/2.25/1/.55/.57
 97
      25/3/2/4.25/2.25/1/.55/.57
 98
      26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF
      26/2/CBADP&L/CBADP&L/OFF/OFF/OFF/OFF/OFF/OFF
 99
      26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF
100
101
      27/1/118/SF-PERS/255/255/1.03/WATT-SF
      27/2////.81/WATT-SF
102
103
      27/3////.56/WATT-SF
104
      29/1////.36/CFM-SF/.36/CFM-SF
      29/2//////.36/CFM-SF
105
106
      29/3////.36/CFM-SF/.36/CFM-SF
107
      30/1/5519/CFM
108
      SYSTEM - 2
      39/2/REPLACE FLUORESCENT FIXTURES
109
110
      40/1/SZ
111
      41/1/1/1
112
      42/1/1
113
      45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
114
      40/2/PTAC
115
      41/2/3/3
116
      42/2/.2
```

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CONTENTS OF : E:\CB45B.TM
LINE # -----
117
       45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
118
119
       41/3/1/3
 120
       45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
121
       EQUIPMENT - 2
       59/2/CARLISLE///REPLACE FLUORESCENT FIXTURES
122
       60/1/1/BLKPLANT/1/1
123
       60/2/2/BLKPLANT/2/2
124
125
      62/1/EQ1161/1
126
       62/2/EQ1161/1
127
      65/1/1//3/3
128
      67/1/EQ2102/1
129
      69/1/EQ4003
130
      69/2/EQ4003
131
      LOAD - 3
132
      19/3/COMBINED ECOS
133
      20/1/1/OFFICES/4954/1/1/0//9
134
      20/2/2/CORRIDOR TOILETS/1132/1/1/0//9
135
      20/3/3/WOMENS TOILET/108/1/1/0//9
136
      21/M///CBADCTX///CBADHTX
137
      22/1/1/YES////191
138
      22/2/1/YES////191
139
      22/3/1/YES////191
140
      24/1/1/100/7.3//123/18
141
      24/1/2/163/7.3//123/108
142
      24/1/3/38/7.3//123/198
143
      24/1/4/155/7.3//123/288
144
      24/2/1/44/7.3//123/108
145
      24/2/2/39/7.3//123/198
146
      24/2/3/64/7.3//123/288
147
      24/3/1/12/7.3//123/108
148
      24/3/2/9/7.3//123/198
149
      25/1/1/94.1/1/1/.55/.57
150
      25/1/2/175/1/1/.55/.57
151
      25/1/3/4.25/2.25/4/.55/.57
      25/1/4/166/1/1/.55/.57
152
153
      25/2/1/4.25/2.25/5/.55/.57
154
      25/2/2/4.25/2.25/4/.55/.57
155
      25/2/3/4.25/2.25/8/.55/.57
156
      25/3/1/4.25/2.25/1/.55/.57
157
      25/3/2/4.25/2.25/1/.55/.57
      26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF
158
159
      26/2/CBADP&L/CBADP&L/OFF/OFF/OFF/OFF/OFF/OFF
      26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF
160
      27/1/118/SF-PERS/255/255/1.03/WATT-SF
161
162
      27/2////.81/WATT-SF
163
      27/3////.56/WATT-SF
164
      29/1////.23/CFM-SF/.23/CFM-SF
      29/2/////.23/CFM-SF
165
166
      29/3////.23/CFM-SF/.23/CFM-SF
167
      30/1/5519/CFM.
168
      SYSTEM - 3
169
      39/3/COMBINED ECOS
170
      40/1/SZ
171
      41/1/1/1
172
      42/1/1
      45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
173
174
      40/2/PTAC
```

```
CONTENTS OF : E:\CB45B.TM
LINE #
175
       41/2/3/3
176
       42/2/.2
177
       45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
       40/3/RAD
178
179
       41/3/1/3
180
       45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
       EQUIPMENT - 3
181
       59/3/CARLISLE///COMBINED ECOS
182
183
       60/1/1/BLKPLANT/1/1
184
       60/2/2/BLKPLANT/2/2
185
       62/1/EQ1161/1
186
       62/2/EQ1161/1
       65/1/1//3/3
187
188
       67/1/EQ2102/1
       69/1/EQ4003
189
190
       69/2/EQ4003
```

Building 045
Trace Output File

AIRFLOW - ALTERNATIVE 1 BASE BUILDING

------SYSTEM SUMMARY-------(Design Airflow Quantities)

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	0	5,519	5,519	6,717	1,198	0	0
2	PTAC	0	194	194	249	55	0	0
3	RAD	0	0	0	0	1,640	0.	0
Totals		. 0	5,713	5,713	6,966	2,893	0	0

CAPACITY - ALTERNATIVE 1
BASE BUILDING

System Number	System Type	Capacity	Aux. Sys.	ling Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (8tuh)	Heating Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	_
1	SZ	13.3	0.0	0.0	13.3	-171,332	0	0	0	0	0	-171,332
2	PTAC	0.5	0.0	0.0	0.5	-7,403	0	0	0	0	0	-7,403
3	RAD	0.0	0.0	0.0	0.0	-232,438	0	0	0	0	0	-232,438
Totals		13.7	0.0	0.0	13.7	-411,173	0	0	0	0	0	-411,173

The building peaked at hour 16 month 7 with a capacity of 13.7 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

----- ENGINEERING CHECKS-----

System Number			Percent		Cool:	ing		Heat	ing	
	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft
1	Main	SZ	0.00	1.11	415.9	373.4	32.14	1.11	-34.58	4,954
2	Main	PTAC	0.00	1.80	416.4	231.9	51.75	1.80	-68.55	108
	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-37.53	6,194

System 1 Peak SZ - SINGLE ZONE

				PEAK ****										*******
Peaked at	t Time =	:>	Mo/Hr:	7/16	•					1120	<b>(</b>	Mo/Hr:	•	
Outside A	Air ==>	UA	DR/MR/HK:	91/ 73/ 98.	U		*	UA	NDB:	91 ×	<b>(</b>	OAD8:	4	
		Space	Oat Air	Ret. Air	No	t Percnt	* *	Sp	1200	Percnt 4		ak Coil	Peak	Percnt
		Sens.+Lat.	Sensible			l Of Tot		Sensi					Sens	Of Tot
Envelope		(Btuh)		(Btuh)	(Btuh			(Bt		(%)			Btuh)	(%)
Skylite		(81411)			(1000)				0	0.00	•		0	0.00
Skylite		٨	(			0.00				0.00			: 0	0.00
Roof Co	and	22,074	(		22,07				074				; 8,158	10.60
Glass S		17,987	(		17,98				987	15.14			, 130	0.00
Glass C		3,619	(		3,619			3,		3.05 *		52 <i>-</i> 1		
		26,577	(							22.37 *			:	
Partiti		•	,	,	26,57				577		•		2,660 0	
		0			- (				0	0.00 *				0.00
Exposed		0				0.00			0	0.00 *			0	0.00
Infiltr		46,024	,			28.90			213	17.02 *				
Sub Tot		116,280	(	)	116,280			90,	470	76.16	•	32 -17	1,332	100.00
Internal		04.007	,		04.00	, ,, ,,			007	20.44		۸		A A-
Lights		24,283	(	)	24,283				283	20.44 *		•	. 0	0.00
People		20,341	,		20,34			9,		8.11 *		0	0	0.00
Misc		0	(		(				0	0.00 *		0	0	0.00
		44,624	(		44,624				918	28.55 *		0	0	0.00
Ceiling L		0			(					0.00 *		0	0	0.00
Outside A		0	(	0		0.00			0	0.00 *		0	0	0.00
Sup. Fan						2.46				0.00 *			. 0	0.00
Ret. Fan			(		(					0.00 *			. 0	0.00
Duct Heat		5 (0)	(	1	5 (0)			-		0.00 *		٥	0	0.00
OV/UNDR S	-	-5,604	,		-5,604			-5,	604	-4.72 *		0	0	0.00
Exhaust H			(	-	(					0.00 *			0	0.00
Terminal	Bypass		C	0	(	0.00	ł			0.00 *			0	0.00
0 Tak		155 700	,	. ^	150 000			110	704	100 00 +	171 7	70 17	. 770	100 00
Grand 101		155,300	C								-171,3	32 -17	,332	100.00
			000	LING COIL S	ELECTION									
				Coil Airfl									SS (S	f) (%)
	(Tons)			(cfm)							Floor	4,954	İ	
_				5,519									į	
Aux Clg	0.0		0.0	0			0.0	0.0	0.0		ExFlr	0		
)pt Vent	0.0		0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	4,954		0 0
otals	13.3	159.2									Wall	3,329		473 14
	HEATI	NG COIL SEL			AI	RFLOWS (	cfm)-			ENGINEERING	CHECKS	TEMPE	ATURE	s (F)
	Capaci	-			Type	Cooling	ł	Heating		lg % OA	0.0	Type	Clg	Htg
	(Mbh	•			Vent	0		0		lg Cfm/Sqft	1.11	SADB	55.	
Main Htg	-171		519 68.0		Infil	1,198		1,198		lg Cfm/Ton		Plenum	75.	
lux Htg	0		0 0.0		Supply	5,519		5,519		lg Sqft/Ton	373.36	Return	75.	
reheat	-0	.0 5,	519 68.0		Mincfm	0		0	C)	lg Btuh/Sqft	32.14	Ret/OA	75.	0 68.0
Reheat	0	.0	0 0.0		Return	5,519		5,519		o. People	42	Runarnd	75.	
lumidif	0	.0	0.0	0.0	Exhaust	0		0		tg % OA	0.0	Fn MtrT	0.	2 0.0
lpt Vent	0	.0	0 0.0	0.0	Rm Exh	0		0	Ht	tg Cfm/SqFt	1.11	Fn BldT	0.	1 0.0
otal	-171	7			Auxil	0		0	U f	tg Btuh/SqFt	-34.58	Fn Fric	0.	4 0.0

PTAC - PACKAGED TERMINAL AIR COND. System 2 Peak

	t Time ==>		Mo/Hr:		^		*			7/16 *		Mo/Hr: 1		
Outside i	A1r ==>	DA:	DB/WB/HR:	91/ 74/105.	0		*	UA	ADB:	91 *		OAD8:	4	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Sı	oace	Percnt *	Space Pea	k Coil	Peak	Percnt
	Se	ns.+Lat.	Sensible	Latent	Total	Of Tot	*	Sensi	ble	Of Tot *	Space Sen	s Tot	Sens	Of Tot
Envelope	Loads	(Btuh)	(Btuh	) (Btuh)	(8tuh)	(%)	*	(Bt	tuh)	(%) *	(Btuh	) (8	Btuh)	(%)
Skylite	e Solr	0	(	)	0	0.00	*		0	0.00 *		0	0	0.00
Skylite	e Cond	0	(	)	0	0.00	*		0	0.00 *		0 ;	0	0.00
Roof Co	ond	416	(	)	416	7.44	*		477	11.23 *	-39	6 '	-396	5.35
Glass	Solar	784	(	)	784	14.03	*		765	18.01 *		0	0	0.00
Glass (	Cond	136	(	)	136	2.43	*		145	3.42 *	-68	9	-689	9.31
Wall Co	ond	1,450	(	)	1,450	25.94	*	1,	531	36.05 *	-2,47	4 -2	2,474	33.43
Partit:	ion	0			0	0.00	*		0	0.00 *		0 :	0	0.00
Expose	d Floor	0			0	0.00	*		0	0.00 *		0	0	0.00
Infilt	ration	2,384			2,384	42.65	*		931	21.92 *	-3,84	4 -3	,844	51.92
Sub To	tal:=>	5,169	(	)	5,169	92.49	*	3,	849	90.63 *	-7,40	3 -7	,403	100.00
Internal	Loads						*			*				
Lights		379	(	)	379	6.77	*		398	9.37 *		0 .	0	0.00
People		0			0	0.00	*		0	0.00 *		0	0	0.00
Misc		0	(	) 0	0	0.00	*		0	0.00 *		0	0	0.00
Sub Tot	tal==>	379	(	0	379	6.77	*		398	9.37 *		0	0	0.00
Ceiling N	Load	0	(	)	0	0.00	*		0	0.00 *		0	0	0.00
Outside A	Air	0	(	) 0	0	0.00	*		0	0.00 *		0	0	0.00
Sup. Fan	Heat				41	0.74	*			0.00 *			0	0.00
Ret. Fan	Heat		(	)	0	0.00	*			0.00 *			0	0.00
Duct Heat	t Pkup		(	)	0	0.00	*			0.00 *		1	0	0.00
OV/UNDR S	Sizing	0			0	0.00	*		0	0.00 *		0	0	0.00
Exhaust 1	Heat		(	) 0	0	0.00	*			0.00 *			0	0.00
Terminal	<b>Bypass</b>		(	0	0	0.00	*			0.00 *			0	0.00
							*			*				
Grand Tot	tal==>	5,548	(	0	5,589	100.00	*	4,	247	100.00 *	-7,40	3 -	,403	100.00
			COC	LING COIL S	ELECTION							AREAS		
	Total C	apacity	Sens Cap.	Coil Airfl	Enteri	ng DB/WB,	/HR	Leav	/ing [	)B/₩B/HR	Gross Tota	l Gla	ss (st	f) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg	F Gra	ins	Deg F	Deg i	Grains	Floor	108		
ain Clg	0.5	5.6	4.1	194	75.1 62	2.5 66	5.5	54.8	52.5	56.8	Part	0		
ux Clg	0.0	0.0	0.0	0	0.0	).0	0.0	0.0	0.0		ExFlr	0		
pt Vent	0.0	0.0	0.0	0	0.0	).0 (	0.0	0.0	0.0	0.0	Roof	108		0 (
otals	0.5	5.6									Wall	153		19 12
	HEATING	COIL SELI	ECTION		AIF	RFLOWS (d	ofm)-			-ENGINEERING	CHECKS	TEMPER	ATURES	S (F)
	Capacity	Coil A	irfl Ent	Lvg	Type	Cooling	1	Heating	C)	lg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfr	m) Deg f		Vent	Õ		0		lg Cfm/Sqft		SADB		103.1
ain Htg	-7.4		194 68.0	103.1	Infil	55		55		lg Cfm/Ton		Plenum	75.0	
ux Htg	0.0		0.0	0.0	Supply	194		194		lg Sqft/Ton		Return	75.0	
reheat	-0.0		194 68.0	54.7	Mincfm	0		0		lg Btuh/Sqft		Ret/OA	75.0	
eheat	0.0		0 0.0	0.0	Return	194		194		. People	0	Runarnd		
umidif	0.0		0.0	0.0	Exhaust	0		0	Hi	tg % OA	0.0	Fn MtrTC		
pt Vent	0.0		0.0	0.0	Rm Exh	0		0	Ht	g Cfm/SqFt		Fn BldT0		
otal .	-7.4				Auxil	0		0	1114	g Btuh/SqFt		Fn Frict		

System 3 Block RAD - RADIATION

******	******	****** C	OOLING COIL	PEAK ****	******	******	****	**** CLG	SPACE	PEAK ****	****** HE	ATING COIL	PEAK	******
	at Time =		Mo/Hr:	•			*		/Hr:	0/0 *	•	Mo/Hr:		
Outside	Air ==>	0A	DB/WB/HR:	0/ 0/ 0.	0		*	0	AD8:	0 *		0AD8:	4	
		Space	Ret. Air	Ret. Air	Ne	t Perc	↑ n† *	S	pace	Percnt *		eak Coil	Peak	Percnt
	:	Sens.+Lat.	Sensible		Total		ot *			Of Tot *			Sens	Of Tot
Envelope		(Btuh)	(Btuh)		(Btuh		%) *			(%) *			Btuh)	(%)
	e Solr	0	0				00 *	(0	0	0.00 *	•	0	0	0.00
	e Cond	0	0				00 *		0	0.00 *		0	. 0	0.00
Roof C		0	0		(		00 *		0	0.00 *			2.703	9.77
Glass		0	0		(		00 *		0	0.00 *			0	0.00
Glass	Cond	0	0		(				0	0.00 *			3.598	10.15
Wall C	ond	0	0		(		00 *		0	0.00 *			1,927	30.94
Partit	ion	0			· (	0.0	00 *		0	0.00 *			0	0.00
Expose	d Floor	0			. (	0.0	00 *		0	0.00 *		0	0	0.00
Infilt	ration	0			(	0.0	00 *		0	0.00 *		210 -11	4,210	49.14
	tal==>	0	0		(		00 *		0	0.00 *			2,438	100.00
Internal	Loads						*			*			,	
Lights		0	0		(	0.0	* 00		0	0.00 *		0	0	0.00
People		0			(	0.0	00 *		0	0.00 *		0	0	0.00
Misc		0	0	0	(	0.0	00 ×		0	0.00 *		0	0	0.00
Sub To	tal==>	0	0	0	(	0.0	)O *		0	0.00 *		0	. 0	0.00
Ceiling	Load	0	0		(	0.0	30 *		0	0.00 *		0	0	0.00
Outside	Air	0	0	0	(	0.0	)() *		0	0.00 *		0	0	0.00
Sup. Fan	Heat				(	0.0	* 00			0.00 *			. 0	0.00
Ret. Fan	Heat		0		0	0.0	)0   *			0.00 *			0	0.00
Duct Hea	t Pkup		0		(	0.0	)() *			0.00 *			0	0.00
OV/UNDR	Sizing	0			C	0.0	)0 *		0	0.00 *		0	0	0.00
Exhaust	Heat		0	0	(	0.0	)() ≭			0.00 *			. 0	0.00
Terminal	Bypass		0	Ĉ	Q	0.0	)() *			0.00 *			0	0.00
							*			*				
Grand To	tal==>	0	0	0	C	0.0	)() *		0	0.00 *	-232,4	38 -23	2,438	100.00
			cool									AREAS		
			Sens Cap.								Gross Tot	al Gla	ss (s	f) (%)
	(Tons)		(Mbh)							Grains	Floor		Ì	
			0.0					0.0	0.0	0.0	Part	0		
Aux Clg	0.0	0.0	0.0	0		0.0	0.0	0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	6,194		0 0
Totals	0.0	0.0									Wall	4,555		655 14
			ECTION		AI	RFLOWS	(cfm)		{	NGINEERING	CHECKS	TEMPER	ATURES	S (F)
	Capacit	•			Type	Coolir	ng	Heating	-	3 % OA	0.0	Type	Clg	-
	(Mbh)		•	Deg F	Vent		0	0		; Cfm/Saft	0.00	SADB	0.0	
Main Htg	-232.		0 0.0	0.0	Infil		0	1,640		Cfm/Ton		Plenum	0.0	
Aux Htg	0.		0.0	0.0	Supply		0	0		Sqft/Ton	0.00	Return	0.0	
Preheat	0.		0.0	0.0	Mincfm		0	0	-	ß Btuh/Sqft		Ret/OA	0.0	
Reheat	0.		0.0	0.0	Return		0	0		People	0	Runarnd	0.0	
Humidif	0.		0.0	0.0	Exhaust		0	0		% 0A	0.0	Fn MtrT	1	
opt Vent	0.		0.0	0.0	Rm Exh		0	0	-	Cfm/SqFt	0.00	Fn BldT(		
Total	-232.	4			Auxil		0	0	Htg	; Btuh/SqFt	-37.53	Fn Frict	0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

----- BUILDING U-VALUES -----

					Roo	m U-Val	ues				Room	Room
					(Btu	/hr/sqf	t/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
2	CORRIDOR TOILETS	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
3	WOMENS FOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.283	0.000	48.8	12.99
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	32.0	9.63
Buildin	g	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	31.5	9.54

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

----- BUILDING AREAS -----

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	<ol> <li>Total/Ave.</li> </ol>				4,954	0	0	0	0	4,954	473	14	2,855
System	<pre>1 Total/Ave.</pre>				4,954	0	0	0	0	4,954	473	14	2,855
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	2 Total/Ave.				108	0	0	0	0	108	19	12	134
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	<pre>1 Total/Ave.</pre>				4,954	0	0	0	0	4,954	473	14	2,855
2	CORRIDOR TOILETS	1	1	1,132	1,132	0	0	0	0	1.132	163	15	911
Zone	2 Total/Ave.				1,132	0	0	0	0	1,132	163	15	911
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	3 Total/Ave.				6,194	0	0	0	0	6,194	655	14	3,900
Buildin	·				11,256	0	0	0	0	11,256	1,148	14	6,890

V 600

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ASHRAE 90 ANALYSIS - ALTERNATIVE 1 BASE BUILDING

------ A S H R A E 90 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.326 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.169 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 21.38 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1 BASE BUILDING

------SYSTEM LOAD PROFILE------

# System Totals

Percent	Cool	ing Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours Hours	
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.7	6	45	-20,559	14	359	285.6	0	0	0.0	0 0	i
5 - 10	1.4	5	41	-41,117	24	593	571.3	0	0	0.0	0 : 0	
10 - 15	2.1	7	22	-61,676	18	439	856.9	0	0	0.0	0 0	ı
15 - 20	2.7	0	0	-82,235	13	312	1,142.6	0	٥	0.0	0 0	ł
20 - 25	3.4	6	45	-102,793	12	294	1,428.2	0	0	0.0	0 0	i
25 - 30	4.1	10	79	-123,352	12	19	1,713.9	0	0	0.0	0 0	į
30 - 35	4.1	8	64	-143,911	0	0	1,999.5	0	0	0.0	0 0	i
35 - 40	5.5	3	26	-164,469	1	36	2,285.2	0	0	0.0	0 0	
		_			0	5	·	0	0	0.0	0 0	
40 - 45	6.2	12	92	-185,028	•	_	2,570.8	•	•		, ,	
45 - 50	6.9	3	23	-205.587	0	0	2,856.5	0	0	0.0	0 1 0	
50 - 55	7.6	12	90	-226,145	2	48	3,142.1	0	0	0.0	0 0	ļ
55 - 60	8.2	3	26	-246,704	15	375	3,427.8	0	0	0.0	0 0	į
60 - 65	8.9	9	68	<b>-267</b> ,263	0	0	3,713.4	0	0	0.0	0 0	ŧ
65 - 70	9.6	0	0	-287,821	0	O	3,999.1	0	0	0.0	0 . 0	1
70 - 75	10.3	8	59	-308,380	0	0	4,284.7	0	0	0.0	0 0	ļ
75 - 80	11.0	5	40	<b>-3</b> 28,939	0	0	4,570.3	0	0	0.0	0 0	j
80 - 85	11.7	0	0	-349,497	0	0	4,856.0	0	0	0.0	0 0	ļ
85 - 90	12.4	2	18	-370,056	0	0	5,141.6	0	0	0.0	0 0	)
90 - 95	13.0	2	15	-390,615	0	0	5,427.3	0	0	0.0	0 0	)
95 - 100	13.7	3	25	-411,173	0	0	5,712.9	100	1,070	0.0	0 0	)
Hours Off	0.0	0	7,982	0	0	6,280	0.0	0	7,690	0.0	0 8,760	1

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
BASE BUILDING

					RIITI	DING TEMPERATURE PROFILES	
					0 0 1 1	. DING TENTERNIONE TROPILEO	
Temperature						Zone Number	 
Range	1	3	1	2	3		1
(F)							
Max. Temp.	87.9	88.6	106.6	103.9	102.5		1
Mo./Hr.	7 21	7 20		7 22			
Day Type	4	4	2	1	1		
				• • • • • •		Number of Hours	
Above 100	0	-	,	262	94		i
95 - 100	0	0	774	940	760		
90 - 95	0	_	886	998	1,254		
85 - 90	156		603	742	835		
80 ~ 85	1,355	1,154	487	654	649		
75 - 80	1,837	1,821	20	76	80		
70 - 75	<b>3</b> 75	560	392	154	243		
65 - 70	570	378	1.828	1,988	1,929		
60 - 65	684	809	959	985	883		
55 ~ 60	722	783	743	736	829		
50 - 55	689			1,225	1,204		
Below 50	2,372	2,415	0	0	0		
Min. Temp.	72 7	33.1	54 0	55 A	5. <i>i</i> 0		· 1
Mo./Hr.	2 10		12 2	1 7	2 20		
Day Type	2 10 4	4	4	1 /	2 20		
bay type	4	4	4	1	3		

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMNO On Peak (Thrm/hr)
Jan	3,519	18	519	2
Feb	3,184	18	498	2
March	3,853	18	260	2
April	3,349	18	62	2
May	4,636	40	0	0
June	5,896	41	0	0
July	6,468	42	0	0
Aug	6,164	41	0	0
Sept	4,211	40	0	0
0ct	3,684	18	51	2
Nov	3,350	18	185	2
Dec	3,351	18	422	2
Total	51,666	42	1,998	2

Building Energy Consumption = 33,415 (Btu/Sq Ft/Year) Floor Area = 11,256 (Sq Ft)
Source Energy Consumption = 70,668 (Btu/Sq Ft/Year)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

------EQUIPMENT ENERGY CONSUMPTION-----

Num	Equip Code	Jan	Feb	Mar	Apr	Mon May	thly Con: June	sumption July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS													
	ELEC	3516	3181	3851	3349	3684	3684	3349	3851	3349	3684	3349	3349	42,193
	PK	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3
1	MISC LD													ļ :
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0.	0.0
2	MISC LD GAS	0	0	۸	0	۸	٥	٥	٥	٥	Δ.	Δ.	0	
	PK	0.0	0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0.0
3	MISC LD													1
J	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH20 PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0.0	0	0
	rn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD P CHILL	0	0	0	0	0	0	0	0	0	۸	0	۸	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161		Λ <b>.</b> Τ.Π	CLD COND	00MB 21	E TONO								
1	EFEC	0	0 0	CLD COND 0	0	367	1422	2240	1473	320	0	0	0	5,821
	PK	0.0	0.0	0.0	0.0	17.0	17.8	18.4	17.8	17.2	0.0	0.0	0.0	18.4
1	<b>EQ</b> 5200		COND	ENSER FAI	NS									
	ELEC	0	0	0	0	38	130	216	137	34	0	0	0	555
	PK	0.0	0.0	0.0	0.0	1.2	1.5	1.7	1.5	1.1	0.0	0.0	0.0	1.7
1	EQ5303		CONT											
	ELEC	0	0	0	0	23	66	60	69	16	0	0	0	233
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161			CLD COND										
	ELEC PK	0 0.0	0 0.0	0 0.0	0	0	24	60	34	5	0	0	0	122
	P.N.	0.0	0.0	0.0	0.0	0.5	0.6	0.6	0.6	0.5	0.0	0.0	0.0	0.6
	EQ5200 ELEC	۸		ENSER FAN		۸	^	,	7	•	_	_	•	
	PK	0 0.0	0.0	0.0	0 0.0	0 0.0	2 0.0	6 0.1	3 0.0	0 0.0	0 0.0	0 0.0	0 0.0	12 0.1
		-, -			-,•		V.V	V.1	V.V	VIV	٧.٧	۷.۷	V. V	0.1
2	EQ5303		CONT	ROLS				•						

	ne Air Condit Trane Custom	-		Network											V 600 Page	12
	IPMENT ENERGY BUILDING	CONSUMPT	ION - AL	TERNATIV	E 1											
	ELEC	0	0	0	0	0	44	60	48	11	0	0	0	3 1	163	
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	:	0.3	
1	EQ4003		FC C	ENTRIF.	FAN C.V.									1		
	ELEC	0	0	0	0	520	520	472	543	472	0	0	0	,	2,527	
	PΚ	0.0	0.0	0.0	0.0	2.4	2.4	2.4	2.4	2.4	0.0	0.0	0.0		2.4	
2	EQ4003															
	ELEC	0	0	0	0	5	5	5	6	5	0	0	0	1	27	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	į	0.0	
1	EQ2102		PURC	HASED DI	ST. HOT	WATER								:		
	P HOTH20	519	498	260	62	0	0	0	0	0	51	185	422		1,998	
	PK	2.3	2.3	2.3	2.3	0.0	0.0	0.0	0.0	0.0	2.3	2.3	2.3		2.3	
1	EQ5020 HEAT WATER CIRC. PUMP C.V.															
	ELEC	3	3	2	1	0	0	0	0	0	ĺ	1	3		13	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	•

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
BASE BUILDING

------UTILITY PEAK CHECKSUMS-------

# Utility ELECTRIC DEMAND

Peak Value 42.0 (kW)
Yearly Time of Peak 15 (hr) 7 (mo)

## Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Utility Demand Equipment Description (kW)	Percnt Of Tot (%)
Cooling Ed	quipment		
1 2	EQ1161 EQ1161	AIR-CLD COND COMP <15 TONS 20.3 AIR-CLD COND COMP <15 TONS 0.9	48.47 2.25
Sub Total		21.3	50.72
Sub Total		0.0	0.00
Air Moving	g Equipment		
1 2		SUMMATION OF FAN ELECTRICAL DEMAND 2.4 SUMMATION OF FAN ELECTRICAL DEMAND 0.0	5.63 0.06
Sub Total		2.4	5.69
Sub Total		0.0	0.00
Miscellane	eous		
Lights Base Util Misc Equi Sub Total		18.3 0.0 0.0 18.3	
Grand Tota	ıl	42.0	100.00

**\*\*\*\*\* \*\*\*\*\*** \*\* \*\* TRACE 600 ANALYSIS \*\* \*\* \*\* bγ \*\* **\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*** 

> ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 45

Weather File Code:

CARLISLE

Location:

ENERGY SAVINGS OPPORTUNITY STUDY

Latitude: Longitude:

40.2 (deg) 77.2 (deg)

Time Zone:

5

Elevation:

475 (ft)

Barometric Pressure:

29.2 (in. Hg)

Summer Clearness Number:

1.00

Winter Clearness Number:

1.00

Summer Design Dry Bulb:

92 (F)

Summer Design Wat Bulb:

72 (F)

Winter Design Dry Bulb:

4 (F)

Summer Ground Relectance:

0.20

Winter Ground Relactance:

0.20

Air Density:

0.0742 (Lbm/cuft)

Air Specific Heat:

0.2444 (Btu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)

Latent Heat Factor:

4,790.2 (8tu-min./hr/cuft)

Enthalpy Factor:

4.4519 (Lb-min./hr/suft)

Design Simulation Period: May

To September

System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run:

12:54: 6 1/26/94

Dataset Name:

CB45 .TM

AIRFLOW - ALTERNATIVE 2 WALL & ROOF INSULATION

(Design Airflow Quantities)

----- Main ----- Auxil. Room Outside Cooling Heating Return Exhaust Supply Exhaust Airflow Airflow Airflow Airflow Airflow Airflow System System (Cfm) (Cfm) (Cfm) (Cfm) Number Type (Cfm) (Cfm) 0 5,519 5,519 6,518 999 0 1 SZ 0 96 0 96 96 142 46 0 0 0 0 0 1,367 0 5,615 5,615 6,659 2,411 46 0 96 0 0 2 PTAC 0 0 0 3 RAD 0 0

CAPACITY - ALTERNATIVE 2 WALL & ROOF INSULATION

Totals

(Design Capacity Quantities)

Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Capacity Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) Totals (Btuh) 0.0 0.0 9.4 -105,328 1 SZ 9.4 0 0 0 0 0 -105,328 0 0 0 0 0 0 0 0 0 0 0 0 0 2 PTAC - 0 -4,559 3 RAD 0 -143,370 Totals -253,257

The building peaked at hour 16 month 7 with a capacity of 9.7 tons

ENGINEERING CHECKS - ALTERNATIVE 2 WALL & ROOF INSULATION

			Percent		Cool	ing		Heat	ing	
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	8tuh/ Sq Ft	Cfm/ Sq Ft	8tuh/ Sq Ft	Floor Area Sq Ft
1	Main	SZ	0.00	1.11	588.3	528.1	22.72	1.11	-21.26	4,954
2	Main	PTAC	0.00	0.89	315.1	355.7	33.73	0.89	-42.21	108
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-23.15	6,194

System 1 Peak SZ - SINGLE ZONE

Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 13/ 1 OADB: 4 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 OADB: 91 \* Net Percnt \* Space Percnt \* Space Peak Coil Peak Percnt Space Ret. Air Ret. Air Space Ret. All Ret. All Net Percht \* Space Percht \* Space Percht \* Space Percht \* Space Sens Tot Sens Of Tot Sens. +Lat. Sensible Latent Total Of Tot \* Sensible Of Tot \* Space Sens Tot Sens Of Tot Envelope Loads (Btuh) (Btuh) (Btuh) (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) 0 0 Skylite Solr Skylite Cond 0 0

Roof Cond 8,689 0

Glass Solar 17,987 0

Glass Cond 3,619 0

Wall Cond 4,072 0

Partition 0 Partition 0 0.00 \* 0 0.00 \* 0 0.00 \* 0 0.00 Exposed Floor 0 0 0.00 \* 0 0.00 \* 0 0.00 \* 0 0.00 Infiltration 29,654 29,654 26.34 \* 16,844 19.79 \* -69,551 -69,551 66.03 Sub Total==> 64,021 0 64,021 56.87 \* 51,211 60.16 \* -105,328 -105,328 100.00 \* Internal Loads Lights 24,283 0 24,283 21.57 \* 24,283 28.53 \*

People 20,341 20,341 18.07 \* 9,635 11.32 \*

Misc 0 0 0 0 0.00 \* 0 0.00 \*

Sub Total==> 44,624 0 0 44,624 39.64 \* 33,918 39.84 \* 0 0.00 0 0 0 0.00 0.00 ± 0 0 0.00 0 0 0.00 0 0.00 \* 0 0 0 0 0.00 \* 0 0 0 0 0.00 \* 3,925 3.49 \* 0 0 0.00 \* Ceiling Load 0 0.00 # 0 0.00 0 0.00 0 0.00 \* 0 Outside Air 0.00 \* Sup. Fan Heat 0 0.00 \* 0.00 \* 0 0.00 0 0.00 \* Ret. Fan Heat Duct Heat Pkur 0 0.00 \* 0 0.00 OV/UNDR Sizing 0 -0.00 \* 0 -0.00 \* 0 0 0 0 0.00 + 0 0 0 0.00 \* 0.00 \* Exhaust Heat 0 0.00 0.00 \* Terminal Sypass Grand Total==> 108,645 0 0 112,570 100.00 \* 85,130 100.00 \* -105,328 -105,328 100.00 Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 4,954 5,519 75.0 65.1 79.3 60.2 58.6 73.2 Part 112.6 89.1 0 0 Main Clg 9.4 0.0 Aux Clg 0.0 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 ExFlr Opt Vent 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 Roof 4,954 0.0 0.0 Totals 9.4 112.6 Wall 3,329 473 14 Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 0.0 Type | Clg Htg 
 (Mbh)
 (cfm)
 Deg F
 Deg F
 Vent
 0
 0
 Clg Cfm/Sqft
 1.11
 SAD8
 60.8
 85.5

 Main Htg
 -105.3
 5,519
 68.0
 85.5
 Infil
 999
 999
 Clg Cfm/Ton
 588:33
 Plenum
 75.0
 68.0

 Aux Htg
 0.0
 0
 0.0
 0.0
 Supply
 5,519
 5,519
 Clg Sqft/Ton
 528.10
 Return
 75.0
 68.0
 -0.0 5,519 68.0 60.2 Mincfm 0 0 Clg Btuh/Sqft 22.72 Ret/OA 75.0 68.0 0.0 0 0.0 0.0 Return 5,519 5,519 No. People 42 Runarnd 75.0 68.0 0.0 0 0.0 0.0 Exhaust 0 0 Htg % OA 0.0 Fn MtrTO 0.2 0.0 0.0 0 0.0 0.0 Rm Exh 0 0 Htg Cfm/SqFt 1.11 Fn BldTO 0.1 0.0 -105.3 Auxil 0 Htg Btuh/SqFt -21.26 Fn Frict 0.4 0.0 Preheat Reheat Humidif Opt Vent 0.0 Total -105.3

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

	Time ==>		Mo/Hr:		۸			Mo/Hr:			Mo/Hr:		
Outside A	11r ==>	UA	D8/W8/HR:	91/ /4/105.	0		*	OAD8:	91 *		DADB:	4	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Space	Percnt *	Space Pea	k Coil	Peak	Percnt
	Sei	ns.fLat.	Sensible	Latent	Total	Of Tot	* Se	ensible	Of Tot *	Space Sen	s Tot	Sens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	*	(8tuh)	(%) *	(Btuh	) (1	Btuh)	(%)
Skylite	Solr	0	0		0	0.00	*	0	0.00 *		0	0	0.00
Skylite		0	0		0	0.00		0	0.00 *		0	0	0.00
Roof Co		134	0		134	3.67		188	7.50 *		5 '	-185	4.05
Glass S		784	0		784	21.52		765	30.49 *		0 j	0	0.00
Glass C		136	0		136	3.72		145	5.79 *		9	-689	15.11
Wall Co		204	0		204	5.60		237	9.46 *		2 :	-482	10.58
Partiti		0			0	0.00		0	0.00 *		0	0	0.00
Exposed	Floor	0			0	0.00	*	0	0.00 *		0	0	0.00
Infiltr	ation	1,987			1,987	<b>54</b> .53	*	776	30.92 *	-3,20	3 -3	3,203	70.26
Sub Tot	al::>	3,244	0		3,244	89.05	*	2,111	84.15 *	-4,55	9 -4	1,559	100.00
Internal	Loads						*		*				
Lights		379	0		379	10.39	*	398	15.85 *		0 .	0	0.00
People		0			0	0.00	*	0	0.00 *		0	0	0.00
Misc		0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
Sub Tot	al==>	<b>37</b> 9	0	0	379	10.39	*	398	15.85 *		0	0	0.00
Ceiling L	oad	. 0	0		0	0.00	*	0	0.00 *		0	0	0.00
Outside A	ir	0	0	0	0		<b>t</b>	0	0.00 *		0	0	0.00
Sup. Fan	Heat				20		*		0.00 *			0	0.00
Ret. Fan	Heat		0		0	0.00	*		0.00 *			0	0.00
Duct Heat	Pkup		0		0	0.00	*		0.00 *		1	0	0.00
OV/UNDR S	izing	0			0	0.00	*	0	0.00 *	,	0 ¦	0	0.00
Exhaust H	eat		0	0	C	0.00			0.00 *		!	0	0.00
Terminal	8ypass		0	0	0	0.00	*		0.00 *		1	0	0.00
							i		*		!		
Grand Tot	al::>	3,623	0	0	3,643	100.00	*	2,509	100.00 *	-4,55	9 -4	,559	100.00
			C00l	ING COIL S	ELECTION						AREAS		
	Total Ca		Sens Cap.		Enterin	g D8/W8/	HR L	eaving (	OB/WB/HR	Gross Tota	l Gla	ss (sf	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg	F Grai	ns Deg	F Deg f	Grains	Floor	108		
ain Clg	0.3	3.6	2.4	96	75.1 62	.5 66	.5 50.	8 48.9	9 49.6	Part	0		
ux Clg	0.0	0.0	0.0	0	0.0 0	.0 0	.0 0.	0.0	0.0	Exflr	0		
pt Vent	0.0	0.0	0.0	J	0.0 0	.0 0	.0 0.	0.0	0.0	Roof	108		0 0
otals	0.3	3.6								Wall	153		19 12
	HEATING	COIL SEL	ECTION		AIR	FLOWS (c	fm)		-ENGINEERING	CHECKS	TEMPER	ATURES	(F)
	Capacity	Coil A	irfl Ent	Lvg	Type	Cooling	Heatin	g Cl	lg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfr	n) Degf	Deg F	Vent	0		0 01	g Cfm/Sqft	0.89	SADB		111.8
ain Htg	-4.6		96 68.0	111.8		46			lg Cfm/Ton		Plenum	75.0	
ux Htg	0.0		0.0	0.0	Supply	96		96 Cl	.g Sqft/Ton	355.72	Return	75.0	
reheat	-0.0		96 68.0	50.7	Mincfm	0		0 01	lg Btuh/Sqft	33.73	Ret/OA	75.0	
eheat	0.0		0.0	0.0	Return	96			o. People		Runarnd	75.0	
	0.0		0.0	0.0	Exhaust	0			g % OA		Fn MtrId	0.0	
umidif													
umidif pt Vent	0.0		0.0	0.0	Rm Exh	0		0 Ht	g Cfm/SqFt	0.89	Fn 81dT0	0.0	0.0

System 3 Block RAD - RADIATION

					(*************************************	*******				****** HEAT			******
	at Time ==		Mo/Hr:	•				o/Hr:	,	*	Mo/Hr:	13/ 1	
Outside	Air ==>	0A	ADB/WB/HR:	0/ 0/ 0.	0		<b>*</b> (	OADB:	•	* *	OADB:	4	
		Space	Ret. Air	Ret. Air	Net	Percnt	* (	Space	Percnt 3		ık Coil	Peak	Percnt
	S	ens.+Lat.	Sensible		Total	Of Tot		sible	Of Tot *			Sens	Of Tot
Envelope		(Btuh)	(Btuh)		(Btuh)	(%)		Btuh)	(%) *			Btuh)	(%)
Skylit		0	Ò	, ,	0	0.00		0	0.00 *		0	0	0.00
Skylit		0	0		0	0.00		0	0.00 *		0	: 0	0.00
Roof C		0	0		0	0.00		0	0.00 *		-	0,582	7.38
Glass		0	0		0	0.00		0	0.00 *	•	0	0	0.00
Glass	Cond	0	0		0	0.00		0	0.00 *		•	3,598	16.46
Wall C	ond	0	0		0	0.00		0	0.00 *			4,016	9.78
Partit:		0			0	0.00		0	0.00 *	•	0	0	0.00
Expose	d Floor	0			0	0.00		0	0.00 *		Ö	0	0.00
Infilt		0			0	0.00		0	0.00 *		•	5,175	66.38
Sub To		0	0		0	0.00		0	0.00 *			3,370	100.00
Internal							*	-	*			0,0	AVV
Lights		0	0		0	0.00	1	0	0.00 *		0	Û	0.00
People		0			0	0.00		0	0.00 *		0	0	0.00
Misc		0	0	0	0	0.00		0	0.00 *		0	0	0.00
Sub To	tal==>	0	0		0	0.00		0	0.00 *		0	0	0.00
Ceiling (		0	0		0	0.00		0	0.00 *		0	0	0.00
Outside A		0	0	0	0	0.00		Õ	0.00 *		0	0	0.00
Sup. Fan					0	0.00			0.00 *		•	0	0.00
Ret. Fan			0		0	0.00			0.00 *			0	0.00
Duct Heat			0		0	0.00			0.00 *			' 0	0.00
OV/UNDR S		0			0	0.00		0	0.00 *		0	0	0.00
Exhaust }	-		0	ı)	0	0.00		-	0.00 *		J	0	0.00
Terminal			Ö	0	ģ.	0.00			0.00 *			0	0.00
•	-7:						*		*				0.00
Grand Tot	tal==>	0	. 0	0	0	0.00	*	0	0.00 *	-143,370	0 -143	3,370	100.00
			C00l	LING COIL SE	FLECTION						AREAS-	ļ	
		Capacity	Sens Cap.			g D8/W8/H	R Lea	ving D8	3/WB/HR	Gross Total		۹۹ (sf	f) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	,	F Grain			Grains		6,194		/ (*/
Main Clg	0.0	0.0	0.0	0		.0 0.	-	0.0	0.0	Part	0		
Aux Clg	0.0	0.0	0.0	0		.0 0.		0.0	0.0		0	! !	
Opt Vent	0.0	0.0	0.0	0			0.0	0.0	0.0		5,194	I	0 0
Totals	0.0	0.0					•		•		4,555	6	555 14
	HEATING	COIL SELF	FCTION		AIRF	FINNS (cf	m )	E	NCINFFRING	CHECKS	TEMPER	ATHRES	(F)
		/ Coil Ai		Lvg		Cooling	/ Heating		% OA		Type	Clg	
	(Mbh)					0	-	_	Cfm/Sqft		SADB	0.0	_
Main Htg	-143.4	•	0 0.0	-	Infil		1,367		Cfm/Jon		Plenum	0.0	
Aux Htg	0.0		0 0.0		Supply	0	0		Sqft/Ton		Return	0.0	
Preheat	0.0		0 0.0		Mincfm	0	0	Cla	Stuh/Saft		Ret/OA	0.0	
Reheat	0.0		0 0.0		Return	0	0	_	People		Runarnd		
Humidif	0.0		0 0.0		Exhaust	0	0		respie 1 % OA		Fn MtrTD		
Opt Vent	0.0		0 0.0		Rm Exh	0	0	Hta	гъон :Cfm/SqFt	0.0 0.00	Fn 81dT0		
Total	-143.4		V +,-		Auxil	0	0	-	Btuh/Sqft		Fn Frict		
10141	170.7				nuxti	V	v	1114	o cully our c	-40.13	rii riite	. 0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 2 WALL & ROOF INSULATION

----- BUILDING U-VALUES-----

		Room Mass		Room Capac.								
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	OFFICES	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
1	OFFICES	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
2	CORRIDOR TOILETS	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	39.7	11.18
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	39.7	11.18
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
System	<pre>3 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	34.5	10.14
Buildin	g	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	34.0	10.03

BUILDING AREAS - ALTERNATIVE 2 WALL & ROOF INSULATION

----- BUILDING AREAS -----

Room Number	Description	Numbe Dupli Flr		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
System	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	<pre>2 Total/Ave.</pre>				108	0	0	0	0	108	19	12	134
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	<pre>1 Total/Ave.</pre>				4,954	0	0	0	0	4,954	473	14	2,855
2	CORRIDOR TOILETS	1	1	1,132	1,132	0	0	0	0	1,132	163	15	911
Zone	<pre>2 Total/Ave.</pre>				1,132	0	0	0	0	1,132	163	15	911
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	<ol><li>3 Total/Ave.</li></ol>				108	0	0	0	0	108	19	12	134
System	3 Total/Ave.				6,194	0	0	0	0	6,194	655	14	3,900
Buildin	g				11,256	0	0	0	0	11,256	1,148	14	6,890

ASHRAE 90 ANALYSIS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- A S H R A E 9 O A N A L Y S I S -----

Overall Roof U-Value = 0.027 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.127 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.068 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.33 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 13.54 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 WALL & ROOF INSULATION

# System Totals

Percent	Cool	ing Loa	id	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.5	4	34	-12,663	25	<b>4</b> 96	280.7	0	0	0.0	0	0
5 - 10	1.0	0	0	-25,326	13	254	561.5	0	0	0.0	0	0
10 - 15	1.5	3	30	-37,989	17	330	842.2	0	0	0.0	0.	0
15 - 20	1.9	2	20	-50,651	13	247	1,122.9	0	0	0.0	0	0
20 - 25	2.4	7	61	-63,314	5	88	1,403.7	0	0	0.0	0.	0
25 - 30	2.9	9	81	-75,977	1	19	1,684.4	0	0	0.0	0	0
30 - 35	3.4	7	62	-88,640	1	22	1,965.1	0	0	0.0	0	0
35 - 40	3.9	9	81	-101,303	1	20	2,245.9	0	0	0.0	0	0
40 - 45	4.4	4	34	-113,966	0	4	2,526.6	0	0	0.0	0	0
45 - 50	4.8	13	118	-126,629	1	17	2,807.3	0	0	0.0	01	0
50 - 55	5.3	5	42	-139,292	1	21	3,088.1	0	0	0.0	0	0
55 - 60	5.8	4	38	-151,954	22	432	3,368.8	0	0	0.0	0.	0
60 - 65	6.3	3	27	-164,617	0	0	3,649.5	0	0	0.0	0 ;	0
65 - 70	6.8	8	68	-177,280	0	0	3,930.3	0	0	0.0	0	0
70 - 75	7.3	2	20	-189,943	0	0	4,211.0	0	0	0.0	0	0
75 - 80	7.7	5	44	-202,606	0	0	4,491.7	0	0	0.0	0	0
80 - 85	8.2	4	35	-215.269	0	0	4,772.5	0	0	0.0	0	0
85 - 90	8.7	0	4	-227,932	0	0	5,053.2	0	0	0.0	0	0
90 - 95	9.2	0	0	-240,595	0	0	5,333.9	0	0	0.0	0	0
95 - 100	9.7	10	87	-253,257	0	0	5,614.7	100	1,070	0.0	0	0
Hours Off	0.0	0	7,874	0	0	6,810	0.0	0	7,690	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 WALL & ROOF INSULATION

					<b>.</b>		
					8011	DING TEMPERATURE PROFILES	
Temperature						Zone Number	
Range	1	3	1	2	3	1	
(F)						i	
Max. Temp.	85.3	85.4	118.2	110.3	108.0	į	
Mo./Hr.	7 22				8 21	ļ.	
Day Type	4					·	
,						į	
						Number of Hours	
Above 100	0	0	2,812	2,054	1,926	i	
95 - 100	0	0	116	765	846	1	
90 - 95	0		168	129	156	•	
85 - 90	30		396	348			
80 - 85	1,184		520				
75 - 80		2,145					
70 - 75	653		424		350		
65 - 70	339			1,922		ł	
60 - 65	1,017			1,104		I	
55 - 60	441				751		
50 - 55	1,411						
Below 50	1,444	2,324	0	0	0		
Min Tomn	35.2	75 2	540	55.0	55.0		
Min. Temp. Mo./Hr.	2 8		54.9 3 10				
	2 6		3 10	1 /	1 6		
Day Type	J	2	4	4	2		

Trane Air Conditioning Economics

By: Trane Customer Direct Service Network

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2

WALL & ROOF INSULATION

------ MONTHLY ENERGY CONSUMPTION ------

Month	ELEC Off Peak (kWh)	DEMAND On Peak (k\)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	3,518	18	287	1
Feb	3,183	18	281	1
March	3,852	18	138	1
April	3,349	18	27	1
May	4,654	33	0	0
June	5,652	35	0	0
July	5,969	36	0	0
Aug	5,952	35	0	0
Sept	4,343	35	0	0
Oct	3,684	18	16	1
Nov	3,349	18	82	1
Dec	3,350	18	222	1
Total	50,854	36	1,053	1

Building Energy Consumption = 24,779 (Btu/Sq Ft/Year)
Source Energy Consumption = 58,743 (Btu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref	Equip -					Moni	thly Cons	sumption						i
	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct.	Nov	Dec	Total
0														
	ELEC PK	3516 18.3	3181 18.3	3851 18.3	3349 18.3	3684 18.3	3684 18.3	3349 18.3	3851 18.3	3349 18.3	3684 18.3	3349 18.3	3349 18.3	42,193 18.3
	r II	10.0	10.0	10.0	10.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
1	MISC LD ELEC	•	۸	۸	۸	۸	^	۸	۸	۸		۸	0	0
	PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0.0	0.0	0.0	0.0
														•
2	MISC LD GAS	0	0	0	0	0	0	0	0	0	ı)	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	MICO ID													1
3	MISC LD OIL	0	. 0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
•	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	bK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH20	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 <b>0.</b> 0	0 0.0	0.0	0.0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0
6	MISC LD		^			•		•	^	٥	•	^		
	P CHILL PK	0.0	0.0	0 0.0	0.0	0 0.0	0.0	0 0.0	0 0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161 ELEC	0	AIR- O	CLD COND 0	COMP <1	5 TONS 375	1207	1802	1286	427	0	0	0	5,098
	PK	0.0	0.0	0.0	0.0	11.3	12.6	13.0	12.6	12.1	0.0	0.0	0.0	13.0
	EQ5200		כמאט	באסכת כא:	NO.									
1	ELEC	0	0	ENSER FA	0	38	107	175	116	43	0	0	0	478
	PΚ	0.0	0.0	0.0	0.0	0.6	1.0	1.2	1.0	0.8	0.0	0.0	0.0	1.2
1	EQ5303		CONT	ROLS										
	ELEC	0	0	0	0	35	66	60	69	36	0	0	0	266
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161		AIR-	CLD COND										
	ELEC	0	0	0	0	0	18	45	27	3	0	0	0	93
	PK	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.4
	EQ5200			ENSER FA		_			_					
	ELEC PK	0 0.0	0	0 0.0	0 0.0	0 0.0	2 0.0	4 0.0	3 0.0	0.0	0 0.0	0 0.0	0 0.0	9 0.0
	ιń	٧.٧	0.0	V.V	0.0	٧.٧	ν.ν	v.v	V. V	0.0	٧.٧	٧.٧	۷.۷	0.0
2	EQ5303		CONT	ROLS										

By:	Trane Custom	er Direct	Service	Network										i	PAGE 2
	IPMENT ENERGY L & ROOF INSU		ION - AL	TERNATIV	E 2										
	ELEC	0	0	0	0	0	46	60	55	10	0	0	0		171
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0		0.3
1	EQ4003														
	ELEC	0	0	0	0	520	520	472	543	472	0	0	0		2,527
	PK	0.0	0.0	0.0	0.0	2.4	2.4	2.4	2.4	2.4	0.0	0.0	0.0	:	2.4
2	EQ4003		FC C	ENTRIF.	FAN C.V.										
	ELEC	0	0	0	0	3	3	2	3	2	0	0	0	i	13
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Ì	0.0
1	EQ2102		PURC	HASED DI	ST. HOT	WATER									
	P HOTH20	287	281	138	27	0	0	0	0	0	16	82	222		1,053
	PK	1.4	1.4	1.4	1.4	0.0	0.0	0.0	0.0	0.0	1.4	1.4	1.4	:	1.4
1	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.									
	ELEC	1	1	1	0	0	0	0	0	0	0	1	1		6
	₽K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0

V 600

Trane Air Conditioning Economics

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2 WALL & ROOF INSULATION

-----UTILITY PEAK CHECKSUMS-----

Utility	ELECTRIC	DEMAND
---------	----------	--------

Peak Value 35.9 (kW)
Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

nour 10 monon .				
Eqp. Ref. Equipment Num. Code Name	Equipment Description	Utility Demand (kW)		
Cooling Equipment				
1 EQ1161 2 EQ1161	AIR-CLD COND COMP <15 TONS AIR-CLD COND COMP <15 TONS	14.5	40.30 2.11	
Sub Total		15.2	42.41	
Sub Total		0.0	0.00	
Air Moving Equipment				
1 2	SUMMATION OF FAN ELECTRICAL DEMAND SUMMATION OF FAN ELECTRICAL DEMAND	2.4	6.58 0.03	
Sub Total		2.4	6.61	
Sub Total		0.0	0.00	
Miscellaneous				
Lights Base Utilities Misc Equipment Sub Total		18.3 0.0 0.0 18.3	50.98 0.00 0.00 50.98	
Grand Total		35.9	100.00	

\* TRACE 600 ANALYSIS \*\* \*\* \*\* \*\* by \* 

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES **BUILDING 45** 

Weather File Code:

CARLISLE

Location:

ENERGY SAVINGS OPPORTUNITY STUDY

Latitude: Longitude: 40.2 (deg) 77.2 (deg)

Time Zone:

5

Elevation:

475 (ft)

Barometric Pressure:

29.2 (in. Hg)

Summer Clearness Number:

1.00

Winter Clearness Number:

1.00

Summer Design Dry Bulb:

92 (F)

Summer Design Wet Bulb:

72 (F)

Winter Design Dry 8ulb:

4 (F)

Summer Ground Relectance:

0.20

Winter Ground Relectance:

0.20

Air Density:

0.0742 (Lbm/cuft)

Air Specific Heat:

0.2444 (8tu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)

Latent Heat Factor:

4,790.2 (Btu-min./hr/cuft)

Enthalpy Factor:

4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May

To September

System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run:

13: 5:27 1/26/94

Dataset Name:

CB45 .TM

AIRFLOW - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

------SYSTEM SUMMARY -------(Design Airflow Quantities)

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	0	5,519	5,519	6,484	965	0	0
2	PTAC	0	195	195	239	44	0	0
3	RAD	0	0	0	0	1,321	0	0
Totals		0	5.714	5.714	6.724	2.331	0	0

CAPACITY - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (8tuh) 0 0 0 -155,104 1 SZ 12.5 0.0 0.0 12.5 -155,104 0 2 PTAC 0 0 0 -6,656 0.4 0.0 0.0 0.4 -6.656 0 0 -210,231 3 RAD 0.0 0.0 0.0 0.0 -210,2310 0 0 0 0 -371,990 Totals 12.9 0.0 0.0 12.9 -371,990 0 0 0 0

The building peaked at hour 16 month 7 with a capacity of 12.9 tons

ENGINEERING CHECKS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- ENGINEERING CHECKS

			Percent		Cool:	ing		Heat		
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft
1	Main	\$Z	0.00	1.11	442.5	397.2	30.21	1.11	-31.31	4,954
2	Main	PTAC	0.00	1.80	455.9	252.8	47.46	1.80	-61.63	108
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-33.94	6,194

System 1 Peak SZ - SINGLE ZONE

Peaked at				lo/Hr:								16 *		Mo/Hr:	-	
Outside A	Air ==>		OADB/W	18/HR:	91/ 73/ 98.0	)			*	OADB	: 91	. * *		OAD8:	4	
		Spac	ce f	Ret. Air	Ret. Air	N	let F	ercnt	*	Space	е	Percnt *		ak Coi	l Peak	Percnt
		Sens.+Lai		ensible		Tot		f Tot		nsibl	е	Of Tot *	Space Se	ens To	t Sens	Of Tot
Envelope	Loads	(Btul		(Btuh)				(%)		(Btuh	)	(%) *	(Bti	ıh)	(Btuh)	(%)
Skylite		•	0	0		•		0.00	*		0	0.00 *		0	. 0	0.00
Skylite	e Cond		0	0				0.00	*	(	0	0.00 *		0	0	0.00
Roof Co	ond	22,0	74	0		22,0		14.75		22,07	4	19.32 *	-18,1	.58 -	18,158	11.71
Glass S		17,98		0		17,9		12.02				15.74 *		0		0.00
Glass (	Cond	3,6		0		3,6	19	2.42	*	3,619	9	3.17 *	-17,0	52 -	17,052	10.99
	ond			0		26,5	577	17.76	*	26,57	7	23.26 *	-52,6	60 -	52,660	33.95
Partiti		·					0	0.00	*	(	0	0.00 *		0	0	0.00
	floor		0			-		0.00	*	(	0	0.00 *		0	0	0.00
Infiltr		37,0	75			37,0	75	24.77	*	16,283	3	14.25 *	-67,2	233 -	67,233	43.35
Sub Tot		107,33		0		107,3		71.71				75.74 *			55,104	100.00
Internal		,				, -			*	,		*				
Lights		24,28	33	0		24,2	83	16.22	*	24,283	3	21.25 *		0	0	0.00
People		20,34	<b>1</b> 1			20,3		13.59		9,63		8.43 *		0	0	0.00
Misc		,	0	0	0	,		0.00				0.00 *		0	0	0.00
	tal==>	44,62	24	0	0	44,6		29.81		33,918				0	0	0.00
Ceiling L		,		0				0.00		. (	)	0.00 *		0	0	0.00
Outside A			0	0	0			0.00		(	)	0.00 *		0	0	0.00
Sup. Fan						3,9	25	2.62	*			0.00 *			0	0.00
Ret. Fan				0		•	0	0.00	*			0.00 *			0	0.00
Duct Heat				0			0	0.00	*			0.00 *			0	0.00
OV/UNDR S		-6,19	97			-6,1	.97	-4.14	*	-6,19	7	-5.42 *		0	0	0.00
Exhaust H		,		0	0	•	0	0.00	*			0.00 *			0	0.00
Terminal				0	0		0	0.00	*			0.00 *			0	0.00
	•								*			*				
Grand Tot	tal==>	145,75	59	0	0	149,6	83 1	00.00	* 1	14,26	1	100.00 *	-155,1	.04 -1!	55,104	100.00
				coo	LING COIL SE	ELECTION-								AREA	3	
	Total	Capacity	/ Ser	s Cap.	Coil Airfl	Ente	ring	DB/WB/H	ir L	eaving	g DB/	WB/HR	Gross Tot	al G	lass (s	f) (%)
					(cfm)					F Deg	g F	Grains	Floor	4,954		
Main Clg	12.5	149.	. 7	118.2	5,519	75.0	62.4	66.	5 55.	3 5	3.1	58.2	Part	0		
Aux Clg	0.0			0.0	0	0.0	0.0			0 (	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.	.0	0.0	0	0.0	0.0	0.	0 0.	0 (	0.0	0.0	Roof	4,954		0 0
Totals	12.5	149.	. 7										Wall	3,329		473 14
	HEATI	NG COIL S	SELECTI	0N			AIRFL	.ows (cf	m)		EN	IGINEERING	CHECKS	TEMP	ERATURE	s (F)
		ty Coil	l Airfl	Ent		Type	Co	oling	Heatir	ıg	Clg		0.0	Type		-
	(Mbh	1)	(cfm)	Deg F	Deg F	Vent		0					1.11	SADB		
Main Htg	-155	.1	5,519	68.0		Infil		965	Ġ			Cfm/Ton		Plenum		
Aux Htg	0	.0	0	0.0	0.0	Supply		5,519	5,5	19		Sqft/Ton		Return		
Preheat	-0		5,519	68.0	55.3	Mincfm		0		0		Btuh/Sqft		Ret/OA		
Reheat	0	1.0	0	0.0		Return		5,519	5,5	19		People		Runarn		
Humidif	C	0.0	0	0.0		Exhaust		0		0	Htg	% OA	0.0	Fn Mtr		
Opt Vent	0	0.0	0	0.0	0.0	Rm Exh		0		0			1.11	Fn Bld		
Total	-155	1				Auxil		0		0	1) L _	AL L / O = C L	-31.31	Fn Fri	ct 0.	4 0.0

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

******	******	****** C	OOLING COIL	PEAK ****	******	*******	****	*** CLG	SPACE	PEAK ****	***** HE	ATING COIL	PEAK :	*****
Peaked at										7/16 *		Mo/Hr:		
			DB/W8/HR:				*			91 *		0AD8:	4	
		Space	Pot Δir	Ret. Air	No t	Percnt	*	Sı	nace	Percnt *		eak Coil	Peak	Percnt
	۹۶	ns.+Lat.							ible				Sens	Of Tot
Envelope			(Btuh)							(%) *				(%)
Skylite		(60011)			(50011)				0	0.00 *			0	0.00
Skylite		0	0		0				0	0.00 *			0	0.00
Roof Co		416	0		416				477	11.73 *			-396	5.95
Glass S		784	0		784				765	18.82 *		0	0	0.00
Glass C		136	0		136				145	3.57 *	-6	689	-689	10.35
Wall Co		1,450	0		1,450				,531	37.66 *		174 -	2,474	37.18
Partiti		0	v		1,430				0	0.00 *	٠,٠	·	0	0.00
Exposed		0			0				0	0.00 *		Ŏ	۸	0.00
Infiltr		1,920				37.46				18.44 *				
Sub Tot		4,706	0		•				,668	90.22 *		656 -		
		4,700	V		4,706	71.00	*	٠,	,000	7V.22 *		),)0	0,000	100.00
Internal	LUAUS	379	0		379	7.39			398	9.78 *		0	0	0.00
Lights			U		0				0	0.00 *		0	0	0.00
People		0	0	0	0				0	0.00 *		0	0	0.00
Misc	al==>	770	0	0	379				398	9.78 *		0	0	0.00
		379 0	0	V	_				0	0.00 *		0	0	0.00
Ceiling L				0	0				0	0.00 *		0	0	0.00
Outside A		0	0	U	0				V	0.00 *		V	0	0.00
Sup. Fan			۸		42								0	0.00
Ret. Fan			0		0					0.00 *			0	0.00
Duct Heat		Δ	0		0				. 0	0.00 * 0.00 *		0	0	0.00
OV/UNDR S	_	. 0	٨	٨	0.				. 0	0.00 *		V	0	0.00
Exhaust H			.0	0	0					0.00 *			0	0.00
Terminal	руразз		U	U	V	0.00	*			V.00 *			v	0.00
Grand Tota	al==>	5,084	0	0	5,126	100.00		4,	,066	·	-6,6	56 -	6,656	100.00
										8/W8/HR			ass (s	f) (%)
			(Mbh)								Floor			
1ain Clg	0.4	5.1	4.0	195	75.1 62	2.5 66	5.5	55.7	53.5	58.9	Part	0		
Aux Clg	0.0	0.0	0.0	0			0.0	0.0	0.0		ExFlr	0		
)pt Vent	0.0	0.0	0.0	0	0.0	).0 0	0.0	0.0	0.0	0.0	Roof	108		0 0
otals (	0.4	5.1									Wall	153		19 12
			ECTION		AIF					ENGINEERING				S (F)
	Capacity			-	Type	Cooling	Н	eating		g % 0A	0.0	Type	Clg	
	(Mbh)	(cfi		Deg F	Vent	0		0		g Cfm/Sqft	1.80	SADB	55.8	
1ain Htg	-6.7		195 68.0	99.4	Infil	44		44		g Cfm/Ton	455.87	Plenum	75.(	
Yux Htg	0.0		0.0	0.0	Supply	195		195		g Sqft/Ton	252.84	Return	75.0	
reheat	-0.0		195 68.0	55.6	Minofm	0		0		g Btuh/Sqft		Ret/OA	75.0	
Reheat	0.0		0.0	0.0	Return	195		195		. People	0	Runarnd	75.0	
Humidif	0.0		0.0	0.0	Exhaust	0		0		g % OA	0.0	Fn MtrT		
)pt Vent	0.0		0.0	0.0	Rm Exh	0		0		g Cfm/SqFt	1.80	Fn BldT		
「otal	-6.7				Auxil	0		0	Ht	g Btuh/SqFt	-61.63	Fn Fric	t 0.	0.0

System 3 Block RAD - RADIATION

******	*******	****** C	OOLING COIL	PEAK ****	*******	*****	*****	**** CLG	SPACE	PEAK ****	***** HEA	TING COIL	PEAK *	*****
	t Time ==>						*		/Hr:			Mo/Hr: 1		
	Air ==>			0/ 0/ 0.	0		*	0	ADB:	0 *		OAD8:	•	
		0	Dal Ain	0-4 4:-	<b>1</b> 1_		* *			*		انده باد	Da a le	
	0-	Space		Ret. Air			cnt *		pace	Percnt *				Percnt
F1		ens.+Lat.	Sensible		Tota		Tot *			Of Tot *				Of Tot
Envelope		(Btuh)	(Btuh)		(Btuh		(%) *		tuh)	(%) *		-	- 1	(%)
Skylit		0	0				.00 *		0	0.00 *			0	0.00
Skylit		0	0				.00 *		0	0.00 *		0	0	0.00
Roof C		0	0				* 00.		0	0.00 *			,703	10.80
Glass		0	0				.00 *		0	0.00 *			0	0.00
Glass		0	0				.00 *		0	0.00 *		98 -23		11.22
Wall C		0	0				.00 *		0	0.00 *		27 -71		34.21
Partit		0			_		.00 *		0	0.00 *			0	0.00
	d Floor	0					.00 *		0	0.00 *		0	0	0.00
Infilt		0					.00 *		0	0.00 *		02 -92		
Sub To		0	0			0 0	.00 *		0	0.00 *	-210,2	31 -210	,231	100.00
Internal							*			*				
Lights		0	0				.00 *		0	0.00 *		0	0	0.00
People		0					.00 *		0	0.00 *		0	0	0.00
Misc		0	0	0		0 0	.00 *		0	0.00 *		0	0	0.00
Sub To	tal==>	0	0	0		0 0	.00 *		0	0.00 *		0 .	0	0.00
Ceiling	Load	0	0	÷		0 0	.00 *		0	0.00 *		0	0	0.00
Outside #	Air	0	0	0		0 0	.00 *	-	0	0.00 *		0	0	0.00
Sup. Fan	Heat					0 0	.00 *			0.00 *			0	0.00
Ret. Fan	Heat		0			0 0	.00 *			0.00 *			0	0.00
Duct Hear	t Pkup		0			0 0	.00 *			0.00 *			0	0.00
OV/UNDR S	Sizing	- 0				0 0	.00 *		0	0.00 *		0	0	0.00
Exhaust	Heat		0	0		0 0	.00 *			0.00 *			0	0.00
Terminal	Bypass		0	0		0 0	.00 *			0.00 *			0	0.00
							*			*				
Grand To	tal==>	0	0	0	1	0 0	.00 *		0	0.00 *	-210,2	31 -210	,231	100.00
			cool	ING COIL S	ELECTION							AREAS-		
	Total C	apacity	Sens Cap.	Coil Airfl						3/WB/HR	Gross Tot	al Glas	ss (sf	) (%)
			(Mbh)							Grains	Floor	6,194		,
lain Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0		
lux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
pt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	6,194		0 0
otals	0.0	0.0									Wall	4,555	6	55 14
	HEATING	COIL SELE	ECTION		A	IRFLOW:	S (cfm)		8	NGINEERING	CHECKS	TEMPERA	ATURES	(F)
	Capacity				Type	Cool		Heating		% OA	0.0	Type	Clg	Htg
	(Mbh)	(cfa		Deg F	Vent		Ö	0	-	Cfm/Sqft	0.00	SAD8	0.0	_
lain Htg	-210.2		0 0.0	0.0	Infil		0	1,321		Cfm/Ton	0.00	Plenum	0.0	
ux Htg	0.0		0 0.0	0.0	Supply		0	. 0		Sqft/Ton	0.00	Return	0.0	
reheat	0.0	,	0 0.0	0.0	Mincfm		0	0		Btuh/Sqft	0.00	Ret/OA	0.0	
leheat	0.0		0 0.0	0.0	Return		0	0		People	0	Runarnd	0.0	
lumidif	0.0		0 0.0	0.0	Exhaust		0	0		% 0A	0.0	Fn MtrTD	0.0	
pt Vent	0.0		0 0.0	0.0	Rm Exh		0	0		Cfm/SqFt	0.00	Fn 81dTD	0.0	
otal	-210.2			*1*	Auxil		0	0	_	Btuh/SqFt	-33.94	Fn Frict	0.0	
ovai	210.2				HANTI		v	V	1100	, 5541110410	55171		v.v	٧.٧

BUILDING U-VALUES - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

------ BUILDING U-VALUES-------

			Room Mass	Room Capac.								
Room				Summr	Wintr		Summr	Wintr			(lb/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
2	CORRIDOR TOILETS	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	32.0	9.63
Buildin	g	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	31.5	9.54

BUILDING AREAS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

------ BUILDING AREAS ------

Room Number	Description	Number Dupl:	er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
. 1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
System	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
3	WOMENS TOILET	i	1	108	108	0	0	Û	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	2 Total/Ave.				108	0	0	0	0	108	19	12	134
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	<pre>1 Total/Ave.</pre>			·	4,954	0	0	0	0	4,954	473	14	2,855
2	CORRIDOR TOILETS	1	1	1,132	1,132	0	0	0	0	1,132	163	15	911
Zone	2 Total/Ave.			•	1,132	0	0	0	0	1,132	163	15	911
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	3 Total/Ave.				6,194	0	0	0	0	6,194	655	14	3,900
Buildin	•				11,256	0	0	0	0	11,256	1,148	14	6,890

ASHRAE 90 ANALYSIS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- A S H R A E 90 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F) Overall Wall U-Value = 0.326 (Btu/Hr/Sq Ft/F) Overall Building U-Value = 0.169 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 21.38 (Btu/Hr/Sq Ft) SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

## System Totals

Percent	Cool	ing Loa	ad	Heati	ng Load		Cooling	Airflow		Heating	Airflow	v
Design	Cap.			Capacity	Hours		Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.6	3	22	-18,599	18	432	285.7	0	0	0.0	0	0
5 - 10	1.3	3	27	-37,199	22	519	571.4	0	0	0.0	. 0	0
10 - 15	1.9	5	41	-55,798	17	401	857.1	0	0	0.0	0	0
15 - 20	2.6	5	40	-74,398	11	264	1,142.7	0	0	0.0	0	0
20 - 25	3.2	5	39	-92,997	10	234	1,428.4	0	0	0.0	0	0
25 - 30	3.9	5	44	-111,597	2	37	1,714.1	0	0	0.0	0	0
30 - 35	4.5	13	108	-130,196	0	4	1,999.8	0	0	0.0	0	0
35 - 40	5.2	4	34	-148,796	1	19	2,285.5	0	0	0.0	0	0
40 - 45	5.8	7	58	-167,395	0	0	2,571.2	0	0	0.0	0	0
45 - 50	6.5	9	76	-185,995	0	5	2,856.9	0	0	0.0	0	0
50 - 55	7.1	5	46	-204,594	2	43	3,142.5	0	0	0.0	0	0
55 - 60	7.7	5	43	-223,194	17	400	3,428.2	0	0	0.0	0	0
60 - 65	8.4	8	71	-241,793	0	0	3,713.9	0	0	0.0	0	0
65 - 70	9.0	3	23	-260,393	0	0	3,999.6	0	0	0.0	0	0
70 - 75	9.7	. 2	20	-278,992	0	0	4,285.3	0	0	0.0	0	0
75 - 80	10.3	7	60	-297,592	0	0	4,571.0	0	0	0.0	0	0
80 - 85	11.0	- 0	0	-316,191	0	0	4,856.7	0	0	0.0	0	0
85 - 90	11.6	1	9	-334,791	0	0	5,142.4	0	0	0.0	0	0
90 - 95	12.3	2	19	-353,390	0	0	5,428.0	0	0	0.0	0	0
95 - 100	12.9	7	58	-371,990	0	0	5,713.7	100	1,070	0.0	0	0
Hours Off	0.0	0	7,922	0	0	6,402	0.0	0	7,690	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

					BUIL	LDING TEMPERATURE PROFILES
Temperature						Zone Number
Range (F)	1	3	1	2	3	
Max. Temp.	88.4	89.2	106.6	103.9	102.5	
Mo./Hr.	7 21	7 20	7 20	7 22	8 20	
Day Type	4	4	2	1	i	
						Number of Hours
Above 100	0					
95 - 100	Ŏ	_	774			
90 - 95	0	-			1,254	
85 - 90	188					
80 - 85		1,253	469			
75 - 80		1,809				
70 - 75	479			226	298	
65 - 70	525	535	1,770	1,977	1,991	
60 - 65	759			1,000		
55 - 60	607	742	734	758	776	
50 - 55	701	681	1,071	1,127	1,106	
Below 50	2,292	2,203	0	0	0	
Min. Temp.	33.5	34.1	54.9	54.9	54.9	
Mo./Hr.		2 10				
Day Type	4					

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

------ MONTHLY ENERGY CONSUMPTION-----

	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak	On Peak	On Peak	On Peak
Month	(kWh)	(kW)	(Therm)	(Thrm/hr)
Jan	3,519	18	461	2
Feb	3,184	18	436	2
March	3,852	18	220	2
April	3,349	18	42	2
May	4,779	39	0	0
June	5,974	40	0	0
July	6,440	41	0	0
Aug	6,220	40	0	0
Sept	4.312	39	0	0
Oct	3,684	18	38	2
Nov	3,350	18	161	2
Dec	3,351	18	376	2
Total	52,014	41	1,734	2

Building Energy Consumption = 31,178 (Stu/Sq Ft/Year) Floor Area = 11,256 (Sq Ft)
Source Energy Consumption = 67,862 (Stu/Sq Ft/Year)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- EQUIPMENT ENERGY CONSUMPTION------

	Equip -	_					hly Cons			_		**	<b>N</b> · ·	
ım	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Tota
0	LIGHTS					<b></b> .			7051	77.10	7/0/	77.40	77.40	40.40
	ELEC	3516	3181	3851	3349	3684	3684	3349	3851	3349	3684	3349	3349	42,19
	PK	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD		_						_				•	
	GAS	0	0	0	0	0	0	0	0	0	0 0.0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD			_	_				•		•	•	٥	,
	OIL	0	0	0	0	0.0	0 0.0	0 0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD	•	^	•	•		^	٨	٥	^	۸	^	۸	,
	P STEAM	0 0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0
	PK	0.0	0.0	.0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	V.,
5	MISC LD		•	•		•	^	•	•	^	•	^	۸	
	P HOTH20 PK	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0
	PA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	۷.۱
6	MISC LD	۸	- 0	6	۸	٨	۸	Λ	0	٨	٨	٥	0	ĺ
	P CHILL PK	0 0.0	-0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0.0	0 0.0	0.0	0.
	FIL	v.v	V.V	0.0	٧.٧	0.0	٧.٠	0.0	V.5	0.0	0.0	0.0	0.0	<b>v.</b> ,
1	EQ1161	٨		CTD COND			1.400	2217	1507	407	۸	۸	٥	( 11
	ELEC PK	0 0.0	0 0.0	0 0.0	0.0	481 16.0	1490 16.7	2216 17.3	1523 16.8	403 16.1	0 0.0	0 0.0	0 <b>0</b> .0	6,11- 17
		0.0				1010	• • • •							
1	EQ5200 ELEC	0	COND 0	ENSER FA 0	NS O	48	134	214	140	42	0	0	0	578
	PK	0.0	0.0	0.0	0.0	1.3	1.4	1.6	1.4	1.1	0.0	0.0	0.0	1.4
		0.0			0.0	1.0		1.0		*		*	•.•	•••
1	EQ5303	•	CONT		٨	7.5	//		40	00	٨	Δ	٥	25
	ELEC	0 0.0	0 0.0	0.0	0 0.0	35 0.3	66 0.3	60 0.3	69 0.3	22 0.3	0 0.0	0.0	0 0.0	25 0.
	PK	0.0	0.0	0.0	0.0	۷.5	0.5	0.5	0.5	V.3		٧.٧	0.0	0.
2	EQ1161			CLD COND						-	•	•	•	4.0
	ELEC	0	0	0	0	1	27	59	36	7	0	0	0	12
	PK	0.0	0.0	0.0	0.0	0.5	0.5	0.6	0.5	0.5	0.0	0.0	0.0	0.0
2	EQ5200			ENSER FA										
	ELEC	0	0	0	0	0	3	6	3	1	0	0	0	1
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.

	ne Air Condit Trane Custom	-		Network										V 600 Page 38
	IPMENT ENERGY HERSTRIP & C		ION - AL	TERNATIV	E 3									
	ELEC	0	0	0	0	5	46	60	48	11	0	0	0	171
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	0	0	0	0	520	520	472	543	472	0	0	0	2,527
	PK	0.0	0.0	0.0	0.0	2.4	2.4	2.4	2.4	2.4	0.0	0.0	0.0	2.4
2	EQ4003		FC C	ENTRIF.	FAN C.V.									•
	ELEC	0	0	0	0	6	6	5	6	5	0	0	0	27
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2102		PURC	HASED DI	ST. HOT I	WATER								
	P HOTH20	461	436	220	42	0	0	0	0	0	38	161	376	1,734
	PK	2.1	2.1	2.1	2.1	0.0	0.0	0.0	0.0	0.0	2.1	2.1	2.1	2.1
1	EQ5020		HEAT	WATER C	IRC. PUMI	P C.V.								
	ELEC	3	2	1	0	0	0	0	0	0	1	1	2	11
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Miscellaneous

Base Utilities

Misc Equipment

Lights

Sub Total

**Grand Total** 

		AK CHECKSUM IP & CAULKI	S - ALTERNATIVE 3 NG				
				-UTILITY PEAK	CHEC	: KSUM:	S
Uti	lity	ELECTRIC DE	MAND				
		40.8 e of Peak	(k₩) 15 (hr) 7 (mo)				
Hou	r 15 M	onth 7					
Eqp Ref Num		Equipment Code Name		Equipment Description	Utility Demand (kW)	Of Tot	
Coo	ling Eq	uipment					
1 2			AIR-CLD COND COMP AIR-CLD COND COMP		19.2 0.9	47.01 2.23	
Sub	Total				20.1	49.25	
Sub	Total				0.0	0.00	
Air	Moving	Equipment					
1 2			SUMMATION OF FAN E		2.4 0.0	5.80 0.06	
Sub	Total		•		2.4	5.86	
Sub	Total				0.0	0.00	

18.3 44.89

18.3 44.89

40.8 100.00

0.00

0.00

0.0

0.0

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 45

Weather File Code: CARLISLE

Location: ENERGY SAVINGS OPPORTUNITY STUDY

 Latitude:
 40.2 (deg)

 Longitude:
 77.2 (deg)

 Time Zone:
 5

 Elevation:
 475 (ft)

 Barometric Pressure:
 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

 Air Density:
 0.0742 (Lbm/cuft)

 Air Specific Heat:
 0.2444 (8tu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 13:16:58 1/26/94

Dataset Name: CB45 .TM

AIRFLOW - ALTERNATIVE 4
REPLACE FLUORESCENT LAMPS

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflew (Cfm)
1 5	S Z	0	5,519	5,519	6,717	1,198	0	0
2 8	PTAC	0	184	184	239	55	0	0
3 F	RAD	0	0	0	0	1,640	0	0
Totals		0	5,703	5,703	6,956	2,893	0	0

CAPACITY - ALTERNATIVE 4
REPLACE FLUORESCENT LAMPS

----- Cooling ------ Heating -----Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (8tuh) (8tuh) (8tuh) (Btuh) 0 1 SZ 15.4 0.0 0.0 13.4 -171,332 0 0 0 0 -171,332 
 0.5
 0.0
 0.0
 0.5
 -7,403

 0.0
 0.0
 0.0
 0.0
 -232,438

 13.8
 0.0
 0.0
 13.8
 -411,173
 2 PTAC -7,403 0 -232,438 3 RAD Totals 0 -411,173

The building peaked at hour 16 month 7 with a capacity of 13.8 tons

ENGINEERING CHECKS - ALTERNATIVE 4
REPLACE FLUORESCENT LAMPS

------ ENGINEERING CHECKS------

			Percent		Cool:	ing		Heat	ing	
System Number	Main/ Auxiliary	System Type	Outside Air	Ofm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	8tuh/ Sq Ft	Floor Area Sq Ft
1	Main	SZ	0.00	1.11	412.2	370.0	32.43	1.11	-34.58	4,954
2	Main	PTAC	0.00	1.70	405.1	238.2	50.38	1.70	-68.55	108
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-37.53	6,194

System 1 Peak SZ - SINGLE ZONE

Peaked a			Mo/Hr:	7/16				*	Mo	/Hr: `	7/16 *		Mo/Hr:		******
			,	91/ 73/ 98.	0			*		AD8: '	91 *		OADB:		
		Space	Ret Air	Ret. Air	t,	Net 1	Percnt	*	Sr	pace	* * Percnt		ak Coil	Peak	Percnt
		Sens.+Lat.	Sensible		Tot		)f Tot		Sensi		Of Tot *		ns Tot		Of Tot
Envelope		(Btuh)	(Btuh)		(Btu		(%)		(81		(%) *			Btuh)	(%)
Skylit		0	()		,		0.00			Ó	0.00 *		0	0	0.00
Skylit		0	(	)		0	0.00			0	0.00 *		0	0	
Roof C		22,074	(	)	22,0		13.74			074	18.36 *		58 -1	8,158	10.60
Glass		17,987	(	)	17,9		11.20			987	14.96 *		_	0	0.00
Glass		3,619	(	)	3,6		2.25		3,		3.01 *		52 -1	7,052	
Wall Co		26,577	(		26,5		16.54			577	22.11 *	-	60 -5		
Partit		0	•		,		0.00				0.00 *	•		0	
	d Floor	0				0	0.00				0.00 *			0	
Infilt		46,024			46,0		28.65			213	16.81 *		-	-	48.71
Sub To		116,280	C	)	116,2		72.38			470		-		1,332	100.00
Internal		110,100	·		110,2			*	, , ,	11.4	*	•	1/	-,001	
Lights		21,230	C	)	21,2	230	13.21		21	230	17.66 *		0	0	0.00
People			·	,	20,3		12.66		9,		8.02 *		0	0	0.00
Misc		()	C	0	20,0		0.00		-	0	0.00 *		0	0	0.00
Sub To	tal>	41,570	0		41,5		25.88			865	25.68 *		0	0	0.00
Ceiling		0	0	•	41,5	0	0.00			0	0.00 *		0	0	0.00
Outside (		0	0			0	0.00			0	0.00 *		0	0	0.00
Sup. Fan		J	V	V	3,9	•	2.44			V	0.00 *		V	0	0.00
Ret. Fan			0		5,7	0	0.00				0.00 *			0	0.00
Duct Heat			0			0	0.00				0.00 *			0	0.00
OV/UNDR		-1,124	U		-1,1	•	-0.70		_1	124	-0.93 *		0	0	0.00
Exhaust i	_	-1,114	0	0	-1,1	0	0.00		-1,	124	0.00 *		V	0	
Terminal			0	-		0	0.00				0.00 *			0	0.00
1 CI III III G I	υγμασο		V	V		V		*			V.VV *			U	0.00
Grand Tot	tal==>	156,727	0	0	160,6	52 1	00.00	-	120,	211	100.00 *	-171,3	32 -17	1,332	100.00
			200		FLEATION										
,				LING COIL S Coil Airfl								Gross Tot			f) (%)
	(Tons)			(cfm)		_						Floor		(5	., (•,
lain Clg	13.4			5,519	-	-	66.		_	_	56.9	Part	0		
Aux Clg	0.0		0.0	0	0.0	0.0			0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0		0.0	0		0.0			0.0	0.0	0.0	Roof	4,954		0 0
Totals				·	***	• • •	•	•	•••	•••	•••	Wall	3,329		
	HEATI	NG COIL SEL	ECTION			AIRFL	OWS (cf	m)		8	NGINEERING	CHECKS	TEMPE	RATURE	S (F)
		ty Coil A		Lvg			oling		ting	Clo	1 % OA	0.0	Type	Clg	
	•	) (cf:			Vent		0		n	Clo	Cfm/Sqft	1.11	SADB		
Main Htg	-171		-	_	Infil		1,198		1,198		Cfm/Ton		Plenum	75.	
ux Htg	0	0			Supply		5,519		5,519		Sqft/Ton		Return	75.	
reheat	-0	.0 5.	519 68.0		Mincfm		0		0		Btuh/Sqft		Ret/OA	75.	
Reheat	0	.0			Return		5,519		5,519	No.	People	42	Runarnd		
lumidif	0		0 0.0		Exhaust		0		0	Htc	% OA Cfm/SqFt	0.0	Fn MtrI		
opt Vent	0		0 0.0		Rm Exh		Ö		0	Htc	Cfm/SaEt	1 11	Fn BldT		
אטע זכוונ															

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

*****	******	*******	OOLING COIL	PEAK ****	*******	******	***	*** CLG	SPACE	PEAK ****	***** HEAT.	ING COIL P	EAK *	*****
Peaked a Outside			Mo/Hr: DB/WB/HR:	•	0		*		'Hr: DB: '			Mo/Hr: 13 OADB:	/ 1 4	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Sc	ace	* * Percnt	Space Peal	c Coil P	eak	Percnt
		Sens.+Lat.	Sensible			Of Tot		Sensi		Of Tot *	•			Of Tot
Envelope		(Btuh)	(Btuh)		(Btuh)				uh)	(%) *				(%)
Skylit		0	0		0				0	0.00 *	,	•	0	0.00
Skylit		0	0		0				0	0.00 *			Ō	0.00
Roof C		416	0		416				477	11.65 *			396	5.35
Glass		784	0		784				765	18.69 *			0	0.00
Glass		136	0		136				145	3.55 *			689	9.31
Wall C		1,450	0		1,450				531	37.40 *				33.43
Partit		1,430	v		0				0	0.00 *	,		0	0.00
	d Floor	0			. 0				0	0.00 *			0	0.00
Infilt		2,384			2,384				931	22.74 *			844	51.92
Sub To		5,169	0		5,169				849	94.02 *				100.00
Internal		3,107	V		3,107	73.00	*	٠,	047	*	•	, ,	400	100.00
Lights		233	0		233	4.28			245	5.98 *		)	0	0.00
People		233	V		0				0	0.00 *			0	0.00
Misc		0	0	0	0				0	0.00 *		-	0	0.00
	tal::/	233	0	0	233				245	5.98 *			0	0.00
Ceiling		233	0	V	233				0	0.00 *	(	•	0	0.00
Outside:		0	0	0	0				0	0.00 *	(	='	0	0.00
Sup. Fan		V	V	V	39				V	0.00 *	`	,	0	0.00
Ret. Fan			0		0					0.00 *			0	0.00
Duct Hea			0		o o					0.00 *			0	0.00
OV/UNDR		. 0	V		0				0	0.00 *	(	١	0	0.00
Exhaust	-	. 0	0	0	0				V	0.00 *	`	,	0	0.00
			0	0	0					0.00 *			0	0.00
Terminal	pyhass		V	V	٧	V.V0	*			V.VV *			v	V.VV
Grand To	tal==>	5,402	0	0	5,441	100.00		4,	094	100.00 *	-7,403	-7,	403	100.00
			000											
											Gross Total	•	s (sf	) (%)
	(Tons)		(Mbh)							Grains	Floor			
			4.0								Part			
Aux Clg	0.0		0.0	0			.0	0.0	0.0	0.0	Exflr	0		
Opt Vent	0.0		0.0	0	0.0	0.0 0	.0	0.0	0.0	0.0		108		0 0
Totals	0.5	5.4									Wall	153		19 12
			ECTION									TEMPERA		
		ty Coil A		Lvg		Cooling		eating	_	; % OA		Type	Clg	
_	(Mbh			Deg F	Vent	0		0	•	Cfm/Saft		SADB		105.0
Main Htg	-7			105.0	Infil	55		55		Cfm/Ton		Plenum	75.0	
Aux Htg	0			0.0		184		184		Sqft/Ton		Return	75.0	
Preheat	-0			54.3	Mincfa	0		0		Btuh/Sqft		Ret/OA	75.0	
Reheat	0		0 0.0	0.0	Return	184		184		People	0	Runarnd	75.0	68.0
Humidif	0		0 0.0	0.0	Exhaust	0		0	-	) % OA		Fn MtrTD	0.0	
Opt Vent	0		0.0	0.0	Rm Exh	0		0		Cfm/SqFt		Fn BldTD	0.0	0.0
Total	-7	. 4			Auxil	0		0	Нt	3 Btuh/SqFt	-68.55	Fn Frict	0.1	0.0

System 3 Block RAD - RADIATION

			OOLING COIL		*******	*****								******
	t Time ==		Mo/Hr:	•			*			/ 0 *		Mo/Hr:		
Outside (	Alr ==>	OA	DB/WB/HR:	0/ 0/ 0.	0		*	0	ADB:	0 *		OAD8:	4	
		Space	Dot Air	Ret. Air	Ne	·+ n^	rent *	c	222	Barant *	\$2200 No	ak Cail	Peak	Danant
	ę,	space ens.+Lat.	Sensible		Tota		Tot *	sens	pace iblo	Percnt * Of Tot *			Sens	Percnt Of Tot
Envelope		(Btuh)	(Btuh)		(Btul		(%) *		tuh)	(%) *			Stuh)	(%)
Skylite		(0000)	(Brail)				0.00 *	(0	0	0.00 *	-	0	0	0.00
Skylite		0	0				0.00 *		0	0.00 *		0	0	0.00
Roof Co		0	0				0.00 *		0	0.00 *		-	2,703	9.77
Glass S		0	0				0.00 *		0	0.00 *		0	2,703	0.00
Glass (		0	0				0.00 *		0	0.00 *		-	3,598	10.15
Wall Co		0	0				0.00 *		0					
Partiti		0	V				0.00 *		0	0.00 *	•		1,927	30.94
		•							-	0.00 *		0	0	0.00
	floor	0					0.00 *		0	0.00 *		0	0	0.00
Infilt		0	Δ.				0.00 *		0	0.00 *			4,210	49.14
Sub Tot		0	0			0	* 0.00		0	0.00 *	•	38 -23.	2,438	100.00
Internal	Loads	^	^			^			^			^	^	۸ ۸۸
Lights		0	0				0.00 *		0	0.00 *		0	0	0.00
People		0	^	0			0.00 *		0	0.00 *		0	0	0.00
Misc		0	0	0			0.00 *		0	0.00 *		0	0	0.00
Sub Tot		0	0	0			0.00 *		0	0.00 *		0	0	0.00
Ceiling t		0	0				0.00 *		0	0.00 *		0	0	0.00
Outside A		0	0	0			0.00 *		0	0.00 *		0	0	0.00
Sup. Fan							0.00 *			0.00 *			0	0.00
Ret. Fan			0				0.00 *			0.00 *			0	0.00
Duct Heat		•	0				0.00 *		•	0.00 *			0	0.00
OV/UNDR S	_	0	٥	٨			0.00 *		0	0.00 *		0	0	0.00
Exhaust h			0	0			0.00 *			0.00 *			0	0.00
Terminal	gypass		0	0		0	0.00 *			0.00 *			0	0.00
A T		^	0	^		^	*		Λ	*		70 07	170	100.00
Grand Tot	al==>	0	0	0		0	0.00 *		0	0.00 *	-232,4	38 -237	2,438	100.00
			C00!											
			Sens Cap.			•	B/WB/HR				Gross Tot		ass (s	f) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F D	-		Deg F	-	Grains	Floor	6,194		
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0		
Aux Clg	0.0	0.0	0.0	0	0.0		0.0	0.0	0.0	0.0		0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	6,194		0 0
Totals	0.0	0.0									Wall	4,555	•	655 14
	HEATING	COIL SEL	ECTION		A	IRFLO	WS (cfm)		E	NGINEERING	CHECKS	TEMPE	RATURE	S (F)
		Coil A			Type					% OA		Туре	Clg	
		(cfi			Vent		0	0	Clg	Cfm/Sqft	0.00	SADB		_
Main Htg	-232.4		0 0.0	0.0	Infil		0	1,640	Clq	Cfm/Ton	0.00	Plenum	0.	
	0.0		0.0	0.0	Supply		0	. 0	Cla	Sqft/Ton	0.00	Return	0.4	
Preheat	0.0	)	0 0.0	0.0	Mincfm		0	0		Btuh/Sqft		Ret/OA	0.	
Reheat	0.0		0 0.0	0.0	Return		0	0		People	0	Runarnd	0.0	
Humidif	0.0		0 0.0	0.0	Exhaust		0	0		% OA		Fn MtrTI		
Opt Vent	0.0		0 0.0	0.0	Rm Exh		0	0		Cfm/SqFt		Fn BldT		
Total	-232.4				Auxil		0	0		Btuh/SqFt		Fn Fric		

BUILDING U-VALUES - ALTERNATIVE 4
REPLACE FLUDRESCENT LAMPS

						m U-Val /hr/sqf					Room Mass	Room Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
2	CORRIDOR TOILETS	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.39
System	<pre>3 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	32.0	9.63
Buildin	9	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	31.5	9.54

BUILDING AREAS - ALTERNATIVE 4
REPLACE FLUORESCENT LAMPS

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	<pre>1 Total/Ave.</pre>				4,954	0	0	0	0	4,954	473	14	2,855
System	<pre>1 Total/Ave.</pre>				4,954	0	0	0	0	4,954	473	14	2,855
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	2 Total/Ave.				108	0	0	0	0	108	19	12	134
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	<pre>1 Total/Ave.</pre>				4,954	0	0	0	0	4,954	473	14	2,855
2	CORRIDOR TOILETS	1	1	1,132	1,132	0	0	0	0	1,132	163	15	911
Zone	2 Total/Ave.				1,132	0	0	0	0	1,132	163	15	911
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	3 Total/Ave.				6,194	0	0	0	0	6,194	655	14	3,900
Buildin	g				11,256	0	0	0	0	11,256	1,148	14	6,890

ASHRAE 90 ANALYSIS - ALTERNATIVE 4
REPLACE FLUORESCENT LAMPS

----- A S H R A E 9 O A N A L Y S I S -----

Overall Roof U-Value = 0.057 (8tu/Hr/Sq Ft/F) Overall Wall U-Value = 0.326 (8tu/Hr/Sq Ft/F) Overall Building U-Value = 0.169 (8tu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 21.38 (Btu/Hr/Sq Ft) SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4 REPLACE FLUORESCENT LAMPS

#### System Totals

Percent	Cool	ling Loa	ad	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.		Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(8tuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.7	6	45	-20,559	14	344	285.1	0	0	0.0	0	0
5 - 10	1.4	3	23	-41,117	21	518	570.3	0	0	0.0	0	0
10 - 15	2.1	3	26	-61,676	20	497	855.4	0	0	0.0	0	0
15 ~ 20	2.8	2	16	-82,235	12	307	1,140.5	0	0	0.0	0	0
20 - 25	3.5	8	64	-102,793	13	322	1,425.7	0	0	0.0	0	0
25 - 30	4.2	11	85	-123,352	i	35	1,710.8	0	0	0.0	0	0
30 - 35	4.8	6	45	-143,911	0	0	1,995.9	0	0	0.0	0	0
35 - 40	5.5	4	34	-164,469	1	16	2,281.1	0	0	0.0	0	0
40 - 45	6.2	11	86	-185,028	1	20	2,566.2	0	0	0.0	0	0
45 - 50	6.9	3	22	-205,587	0	5	2,851.3	0	0	0.0	0	0
50 - 55	7.6	9	67	-226,145	1	29	3,136.5	0	0	0.0	0	0
55 - 60	8.3	9	67	-246,704	16	394	3,421.6	0	0	0.0	0	0
60 - 65	9.0	3	23	-267,263	0	0	3,706.7	0	0	0.0	0	0
65 - 70	9.7	5	39	-287,821	0	0	3,991.9	0	0	0.0	0	0
70 - 75	10.4	5	40	-308,330	0	0	4,277.0	0	0	0.0	0	0
75 - 80	11.1	3	20	-328,939	0	0	4,562.1	0	0	0.0	0	0
80 - 85	11.8	4	33	-349.497	0	0	4,847.3	0	0	0.0	0	0
85 - 90	12.5	0	0	-370.056	0	0	5,132.4	0	0	0.0	0	0
90 - 95	13.1	0	0	-390.015	0	0	5,417.5	0	0	0.0	0	0
95 - 100	13.8	3	25	-411,173	Û	0	5,702.7	100	1,070	0.0	0	0
Hours Off	0.0	0	8,000	ŷ	0	6,273	0.0	0	7,690	0.0	0	8,760

# BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4 REPLACE FLUORESCENT LAMPS

					BUIL	. DING TEMPERATURE PROFILES
Temperature			- <b></b>			Zone Number
Range (F)	1	3	1	2	3	
Max. Temp.	87.9	88.6	105.7	103.4	101.3	
Mo./Hr.		7 20			8 20	
Day Type	4	4	1	1	1	
						Number of House
Ab 100						Number of Hours
Above 100	0					
95 - 100	0					
90 - 95	0	-			1,276	
85 - 90	156		656			
80 - 85		1,127	549	682		
75 - 80	1,878	1,805	20	100	159	
70 - 75	363	591	308	132	188	
65 - 70	587	348	1,867	2,010	1,940	
60 - 65	575	772	979	981	888	
55 - 60	771	807	764	736	852	
50 - 55	686	727	1,170	1,229	1,220	
Below 50	2,435	2,436	0	0	0	
Min. Temp.	32.6	33.1	54.9	55.0	54.9	
Mo./Hr.					2 20	
Day Type	4	4	5		3	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4 REPLACE FLUORESCENT LAMPS

------ MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	3,064	16	527	2
Feb	2,772	16	505	2
March	3,354	16	268	2
April	2,916	16	67	2
May	4,092	37	0	0
June	5,331	39	0	0
July	5,961	40	0	0
Aug	5,574	39	0	0
Sept	3,707	38	0	0
0ct	3,207	16	59	2
Nov	2,916	16	191	2
Dec	2,918	16	430	2
Total	45,813	40	2,046	2

Building Energy Consumption = 32,069 (Btu/Sq Ft/Year) Floor Area = 11,256 (Sq Ft)
Source Energy Consumption = 65,915 (Btu/Sq Ft/Year)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4
REPLACE FLUORESCENT LAMPS

------ EQUIPMENT ENERGY CONSUMPTION------

	Equip -					Mont	•	•						
um	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Tota
0	LIGHTS													
	ELEC PK	3061 15.9	2769 15.9	3352 15.9	2915 15.9	3206 15.9	3206	2915 15.9	3352	2915	3206	2915	2915	36,72
	۲۸	15.9	13.9	13.7	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.
1	MISC LD		•						_				_	
	ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.
	rn	۷.۷	0.0	0.0	0.0	V.V	0.0		0.0	0.0	0.0	٧.٧	V.V	۷.
2	MISC LD		۸	٨	•	٥		•	•	•	•			
	GAS PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.
	rn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
3	MISC LD	۸		٨	•			•	•				•	
	OIL PK	0 0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.
	1 11	V.V	0.0	۷.۷	V.V	0.0	0.0	V.V	V.V	V.V	V.V	0.0	0.0	٧.
4	MISC LD		٥	Δ.	•			•	•	^		•	•	
	P STEAM PK	0 0.0	0.0	0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0.
	( N	0.0	v.V	۷.۷	0.0	V.V	V.V	V.V	٧.٧	٧.٧	0.0	٧.٧	0.0	۷.
5	MISC LD													
	P HOTH20 PK	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0.0	0.0	0.0	۸
	rn	0.0	0.0	V. U	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
	MISC LD													
	P CHILL PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0,0	0 0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	
	rπ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
	EQ1161			CLD COND										
	ELEC PK	0 0.0	0	0	0	311	1355	2177	1399	264	0	0	0	5,50
	rn .	0.0	0.0	0.0	0.0	17.1	17.9	18.5	18.0	17.3	0.0	0.0	0.0	18.
	EQ5200			ENSER FAI	45									
	ELEC PK	0	0	0	0	33	124	210	131	28	0	0	0	52
	71	0.0	0.0	0.0	0.0	0.8	1.4	1.7	1.4	1.1	0.0	0.0	0.0	1.
	EQ5303		CONT											
	ELEC	0	0	0	0	17	66	60	69	16	0	0	0	22
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.
2	E01161		AIR-	CLD COND	COMP <1	5 TONS								
	ELEC	0	0	0	0	0	20	56	30	2	0	0	0	10
	PΚ	0.0	0.0	0.0	0.0	0.5	0.6	0.6	0.6	0.5	0.0	0.0	0.0	0.
2	EQ5200		COND	ENSER FAI	48									
	ELEC	0	0	0	0	0	2	5	3	0	0	0	0	1
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.

	ne Air Condit Trane Custom			Network										V 600 Page 51
	IPMENT ENERGY LACE FLUORESC			TERNATIV	E 4									
	ELEC	0	0	0	0	0	33	60	41	5	0	0	0	139
	PΚ	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	0	0	0	0	520	520	472	543	472	0	0	0	2,527
	ÞΚ	0.0	0.0	0.0	0.0	2.4	2.4	2.4	2.4	2.4	0.0	0.0	0.0	2.4
2	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	0	0	0	0	5	5	5	5	5	0	0	0	25
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2102		PURC	HASED DI	ST. HOT W	IATER								
	P HOTH20	527	505	268	67	0	0	0	0	0	<b>5</b> 9	191	430	2,046
	PK	2.3	2.3	2.3	2.3	0.0	0.0	0.0	0.0	0.0	2.3	2.3	2.3	2.3
1	EQ5020		HEAT	WATER C	IRC. PUMP	C.V.								
	ELEC	3	3	2	1	0	ŷ	0	0	0	1	1	3	13
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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UTILITY PEAK CHECKSUMS - ALTERNATIVE 4 REPLACE FLUORESCENT LAMPS

-----UTILITY PEAK CHECKSUMS------

### Utility ELECTRIC DEMAND

Peak Value 39.7 (k₩) Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7			
Eqp. Ref. Equipment Num. Code Name	Equipment Description	Utility Demand (kW)	Percnt Of Tot (%)
Cooling Equipment			
1 EQ1161 2 EQ1161	AIR-CLD COND COMP <15 TONS AIR-CLD COND COMP <15 TONS	20.5 0.9	51.56 2.33
Sub Total	•	21.4	53.89
Sub Total		0.0	0.00
Air Moving Equipment			
1 2	SUMMATION OF FAN ELECTRICAL DEMAND SUMMATION OF FAN ELECTRICAL DEMAND	2.4	5.95 0.06
Sub Total		2.4	6.01
Sub Total		0.0	0.00
Miscellaneous			
Lights Base Utilities Misc Equipment Sub Total		15.9 0.0 0.0 15.9	40.10 0.00 0.00 40.10
Grand Total		39.7	100.00

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     TRACE
         600
           ANALYSIS
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 45

bollbing 43		
Weather File Code:	CARLIS	LE
Location:	ENERGY	SAVINGS OPPORTUNITY STUDY
Latitude:	40.2	(deg)
Longitude:	77.2	(deg)
Time Zone:	5	
Elevation:	475	(ft)
Barometric Pressure:	29.2	(in. Hg)
Summer Clearness Number:	1.00	
Winter Clearness Number:	1.00	
Summer Design Dry Bulb:	92	(F)
Summer Design Wat Eulb:	72	(F)
Winter Design Dry Bulb:	4	(F)
Summer Ground Relactance:	0.20	
Winter Ground Relectance:	0.20	
Air Density:	0.0742	(Lbm/cuft)
Air Specific Heat:	0.2444	(Btu/lbm/F)
Density-Specific Heat Prod:	1.0882	(8tu-min./hr/cuft/F)
Latent Heat Factor:	4,790.2	(Btu-min./hr/cuft)
Enthalpy Factor:	4.4519	(Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 1/26/94 14: 9:28

Dataset Name: C8458 .TM AIRFLOW - ALTERNATIVE 1
REPLACE FLUORESCENT BALLASTS

(Design Airflow Quantities)

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	0	5,519	5,519	6,717	1,198	0	0
2	PTAC	0	181	181	236	55	0	0
3	RAD	0	0	0	0	1,640	0	0
Totals		0	5.700	5.700	6.954	2.893	0	0

CAPACITY - ALTERNATIVE 1
REPLACE FLUORESCENT BALLASTS

----- Cooling ------ Heating ------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) 1 SZ 13.1 0.0 0.0 13.1 -171,332 0 0 0 -171,332 0 
 0.4
 0.0
 0.0
 0.4
 -7,403

 0.0
 0.0
 0.0
 0.0
 -232,438

 13.6
 0.0
 0.0
 13.6
 -411,173
 0 0 0 0 0 0 0 0 0 0 -7,403 2 PTAC 0 0 3 RAD 0 -232,438 0 -411,173 Totals

The building peaked at hour 16 month 7 with a capacity of 13.6 tons

ENGINEERING CHECKS - ALTERNATIVE 1
REPLACE FLUORESCENT BALLASTS

			Percent		Cool:	ing		Heat	ing	
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	8tuh/ Sq Ft	Cfm/ Sq Ft	8tuh/ Sq Ft	Floor Area Sq Ft
1	Main	\$Z	0.00	1.11	420.4	377.4	31.80	1.11	-34.58	4,954
2	Main	PTAC	0.00	1.68	402.7	240.3	49.93	1.68	-68.55	108
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-37.53	6,194

by. Traine descends private dervice neone. N

System 1 Peak SZ - SINGLE ZONE

	kr: 13/ 1	Mo/H		*	7/16	/Hr:	Mo	*			//16	o/Hr: 7	M	: Time ==>	Peaked a
	98: 4	OAD		*	91	AD8:	0	*		0	73/ 98.	B/HR: 9	OAD8/W	ir ==>	Outside
Percn	oil Peak	Peak C	Space Pe	nt *	Percn	pace	s	Percnt *	Net		Ret. Air	et. Air	Space R		
Of To:	Tot Sens	Sens	Space Se	t *	Of Tot	ible	Sens	Of Tot *	otal	To	Latent	ensible	s.+Lat. S	Se	
(%	(Btuh)	tuh)	(8tu	* (	(%)	tuh)	(8	(%) *	tuh)	(8)	(Btuh)	(Btuh)	(Btuh)	Loads	Envelope
0.00	0	0		0 *	0.00	0		0.00 *	0			0	0	Solr	Skylit
0.00	0	0		0 *	0.00	0		0.00 *	0			0	0	: Cond	Skylit
10.60	-18,158	,158	-18,1	8 *	18.68	,074	22	14.01 *	,074	22,		0	22,074	nd	Roof C
0.00	0	0		3 *	15.23	, 987	17	11.42 *	, 987	17.		0	17,987	olar	Glass
9.95	-17,052	,052	-17,0	6 *	3.06	619	3	2.30 *	619	3,		0	3,619	ond	Glass
30.7	-52.660	,660	-52,6	0 *	22.50	577	26	16.87 *	,577	26		0	26,577	ind	Wall C
0.00	0	0		0 *	0.00	0		0.00 *	0				0	on	Partit
0.00	0	0		0 *	0.00	0		0.00 *	0	-			0	Floor	Expose
48.71	-83,461	461	-83,4	1 *	17.11	213	20	28.55 *	969	44,			44,969	ation	Infilt
100.00	-171.332		-171,3	8 *	76.58	470		73.15 *	,226			0	15,226	al==>	Sub To
			,	*				*							Internal
0.00	0	0		6 *	15.26	031	18	11.45 *	031	18,		0	18,031		Lights
0.00	0	0		6 *	8.16	635	9	12.91 *	341	20,			20,341		People
0.00	0	0		0 *	0.00	0		0.00 *	0		0	0	0		Misc
0.00	0	0		2 *	23.42	666	27	24.36 *	371	38,	0	0	38,371	al==>	Sub To
0.00	0	0		0 *	0.00	0		0.00 *	0			0	0	oad	Ceiling
0.00	0	0		0 *	0.00	0		0.00 *	0		0	0	0	ir	Outside (
0.00	0			0 *	0.00			2.49 *	925	3,				Heat	Sup. Fan
0.00	0			0 *	0.00			0.00 *	0			0		Heat	Ret. Fan
0.00	0			0 *	0.00			0.00 *	0			0		Pkup	Duct Hea
0.00	0	0		0 *	0.00	0		0.00 *	0				0	izing	OV/UNDR :
0.00	0			0 *	0.00			0.00 *	0		0	0		eat	Exhaust
0.00	0			0 *	0.00			0.00 *	0		Q	0		Bypass	Terminal
				*				*							
100.00	-171,332	332	-171,3	0 *	100.00	136	118	100.00 *	522	157,	0	0	53,597	al==>	Grand To
	EAS			-						ELECTION	ING COIL SI	C00L			
(%)	Glass (sf	tal	Gross Tota			_			_				•	Total C	
		4,954	Floor	S	Grains	Deg F	Deg F	F Grains	Deg	Deg F	(cfm)	1bh)	(Mbh) (	(Tons)	
		0	Part	_		52.9	54.7	7 67.8			5,519	122.1	157.5	13.1	Main Clg
		0				0.0	0.0			0.0	0	0.0	0.0	0.0	Aux Clg
0 (		4,954	Roof	0	0.0	0.0	0.0	0.0	0.	0.0	0	0.0	0.0	0.0	Opt Vent
73 14	4	3,329	Wall										157.5	13.1	Totals
(F)	MPERATURES	TE	CHECKS	RING	ENGINEER			LOWS (cfm)	-AIRF			)N	OIL SELECTI	HEATING	
		Ty	0.0		% 0A	Clo	Heating	-				Ent	Coil Airfl	Capacity	
		SADB	1.11			Cle	0	0		Vent	Deg F	Deg F	(cfm)	<b>(</b> Mbh)	
		Plen			g Cfm/Tor		1,198			Infil	96.5	68.0	5.519	-171.3	1ain Htg
68.0		Retu			g Saft/To		5,519	5,519		Supply	0.0	0.0	0	0.0	Aux Htg
68.0	OA 75.0	Ret/(	31.80		g Btuh/So		0	0		Mincfm	54.7	68.0	5,519	-0.0	Preheat
68.0	rnd 75.0	Runai	42	e	People	No.	5,519	5,519		Return	0.0	0.0	0	0.0	Reheat
0.0	trTD 0.2	Fn Mi	0.0		3 % CA	Htg	0	0	•	Exhaust	0.0	0.0	- 0.	0.0	Humidif
0.0	ldTD 0.1	Fn B	1.11	qFt	cfm/Sqf	Htg	0	0		Rm Exh	0.0	0.0	0	0.0	Opt Vent
0.0	rict 0.4		-34.58					0		Auxil				-171.3	Total

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

******	*******	****** C	OOLING COIL	PEAK ****	********	******	****	**** CLG	SPACE	PEAK ****	***** HEAT	ING COIL	PEAK #	*****
	t Time ==>		Mo/Hr:	•			*		/Hr:			Mo/Hr: 1	3/1	
Outside	Air ==>	0A	D8/W8/HR:	91/ 74/105.	0		*	01	ADB:	91 *		OADB:	4	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Si	oace	Percnt *	Space Pea	k Coil	Peak	Percnt
	Se	ns.+Lat.	Sensible			Of Tot		Sens		Of Tot *				Of Tot
Envelope		(Btuh)	(Btuh)		(Btuh)				tuh)	(%) *			tuh)	(%)
-		Ó	0	•	Ò			,	Ó	0.00 *		Ó	Ó	0.00
-		0	0		0	0.00	*		0	0.00 *		0	0	0.00
Roof C		416	0		416				477	11.75 *		6 .	-396	5.35
Glass	Solar	784	0		784	14.54	*		765	18.86 *		0	0	0.00
Glass	Cond	136	0		136	2.52	*		145	3.58 *	-68	9 .	-689	9.31
Wall C	ond	1,450	0		1,450	26.88	*	1.	531	37.74 *	-2,47	4 -2	,474	33.43
Partit	ion	0			0	0.00	*		0	0.00 *		0	0	0.00
Expose	d Floor	0			0	0.00	*		0	0.00 *		0	0	0.00
Infilt	ration	2,384			2,384	44.20	*		931	22.94 *	-3,84	4 -3	844	51.92
Sub To	tal:=>	5,169	0		5,169	95.85	*	3,	849	94.87 *	-7,40	3 -7	, 403	100.00
Internal	Loads						*			*				
Lights		198	0		198	3.67	*		208	5.13 *		0	0	0.00
People		0			0				0	0.00 *		0	0	0.00
Misc		0	0	0	0				0	0.00 *		0	0	0.00
Sub To		198	0	0	198				208	5.13 *		0	0	0.00
Ceiling		0	0		0				0	0.00 *		0	0	0.00
Outside		0	0	0	0				0	0.00 *		0	0	0.00
Sup. Fan					26					0.00 *			0	0.00
Ret. Fan			0		0					0.00 *			0	0.00
Duct Hea			0		0				•	0.00 *		•	0	0.00
OV/UNDR	_	0		^	0				0	0.00 *	,	0	0	0.00
Exhaust			0	0	0					0.00 *			0	0.00
Terminal	вуразз		0	0	0	0.00	*			0.00 *			0	0.00
Grand To	+-1>	5,367	C	0	5 707	100.00		4,	Λ <b>5</b> 7		-7,40	7 -7	403	100.00
GIANG IO								·		100.00 *		J -7,	400	100.00
										n lun lun				
	Total C		Sens Cap.						_		Gross Tota		55 (51	) (%)
Main Cla	(Tons)	(Mbh)	(Mbh) 3.9	(cfm) 181	-			-	-	Grains	Floor	108 0		
Main Clg	0.4 0.0	5.4 0.0	0.0	161			5.5 0.0		52.1		Part ExFlr	0		
Aux Clg Opt Vent	0.0	0.0	0.0	0			).0	0.0 0.0	0.0			108		0 0
Totals	0.4	5.4	0.0	V	٧.٧	v	). v	0.0	0.0	0.0	Wall	153		19 12
100015	V.4	3.4									Mail	150		1) 12
			ECTION							ENGINEERING		TEMPERA		-
		Coil Ai				Cooling		Heating		g % OA	0.0	Type	Clg	
		(cfn			Vent	0				g Cfm/Sqft		SADB		105.6
Main Htg	-7.4			105.6		55 121		55		g Cfm/Ton		Plenum	75.0	
Aux Htg	0.0		0.0	0.0	Supply	181		181		g Sqft/Ton		Return	75.0	
Preheat	-0.0			54.3	Mincfm	101		0		g Btuh/Sqft		Ret/OA	75.0	
Reheat	0.0		0 0.0	0.0	Return	181		181		. People		Runarnd	75.0	
Humidif	0.0		0 0.0	0.0	Exhaust	0 -		0		g % OA		Fn MtrTD	0.0	
Opt Vent	0.0		0.0	0.0	Rm Exh	0		0		g Cfm/SqFt		Fn BldTD	0.0	
Total	-7.4				Auxil	U		U	n C	g Btuh/SqFt	-00.33	Fn Frict	0.1	0.0

System 3 Block RAD - RADIATION

ime ==> ==> Sen ads olr	OADI Space ns.+Lat.		0/ 0/ 0.0			*	OAD	B: 0	*		OAD8: 4		
ads		Dat Sir							*				
ads			Ret. Air	Net	Percnt	*	Spa	ce	Percnt *	Space Peak	coil Pea	k P	ercn
ads		Sensible	Latent	Total			Sensib		Of Tot *	Space Sens	: Tot Sen	s 0	f To
	(Btuh)	(Btuh)	(Btuh)	(Btuh)			(Btu		(%) *	(Btuh)	(Btuh	)	(%
	(	(0001)	(bruit)	(3341)				Ó	0.00 *	0	)	0	0.0
		. 0		0				0	0.00 *	(	)	0	0.0
ond	0	0		0				0	0.00 *	-22,703	-22,70	3	9.7
	0	0		0				0	0.00 *	. (		0	0.0
ar	0	-		0				0	0.00 *	-23,598	-23,59	8	10.1
d	0	0		•				-					30.
	-	U		·				-				_	0.0
	•							•				0	0.
	-							•			_	0	49.
ion	=	_		•									00.
==>	0	0		C	0.00			v		202,400	202,10	•	•••
ads				_				^			n	٥	0.
	0	0								· ·	-	7	0.
	0										•	•	0.
	0	0	0-	(				-			-		0.
==>	. 0	0	0	. (				-			•	-	0.
ıd	0	0		(							•	^	
	0	0	0	(				0		•	U	0	0.
				(								0	0.
		0		(	0.00	*						0	0.
		0		(	0.00	*					_	0	0.
	0			(	0.00	*		0			0	Ť	0.
		0	0	(								-	0.
pass		0	0	(	0.00	<b>*</b>						0	0.
==>	0	0	0	(	0.00	*		0	0.00 *	-232,43	8 -232,4	38 1	100.
		coo	LING COIL S	ELECTION									
					ing DB/₩8,	/HR	Leav:	ing DB/	/WB/HR			(sf)	( 8
				Deg F D	eg F Grai	ins	Deg F	Deg F	Grains	Floor	6,194		
	• .	•	` 0	0.0			0.0	0.0	0.0	Part	0		
			0	0.0	0.0	0.0	0.0	0.0	0.0				
			0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	6,194		0
0.0	0.0									Wall	4,555	65	5
-HFATINO	G COIL SELI	ECTION		A	IRFLOWS (	cfm)-							
		irfl Ent	Lvg		Cooling	Н	eating					-	H
				Vent	0		0						6
				Infil	0		1,640	-					6
				Supply	0		0					1	6
				Mincfm	0		0	Clg	Btuh/Sqft	0.00	Ret/OA		6
					0		0	No.	People	0	Runarnd	0.0	6
					. 0	)	0	Htg	% OA	0.0	Fn MtrTD	0.0	
							0	_		0.00	Fn BldTD	0.0	
		v v.v	, ,,,		•		0	_			Fn Frict	0.0	
	loor ion ==> ads	O   O   O   O   O   O   O   O   O   O	O	O	O	O	O	O	O	O	O	O	O

BUILDING U-VALUES - ALTERNATIVE 1
REPLACE FLUORESCENT BALLASTS

----- BUILDING U-VALUES -----

						m U-Val ı/hr/sqf					Room Mass	Room Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	<pre>3 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
2	CORRIDOR TOILETS	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	3 Total/Ave.	0.000	0.000	0,000	0.000	0.057	0.550	0.563	0.288	0.000	32.0	9.63
Buildin	g	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	31.5	9.54

BUILDING AREAS - ALTERNATIVE 1
REPLACE FLUORESCENT BALLASTS

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	<ol> <li>Total/Ave.</li> </ol>				4,954	0	0	0	0	4,954	473	14	2,855
System	<pre>1 Total/Ave.</pre>				4,954	0	0	0	0	4,954	473	14	2,855
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	. 0	0	0	0	108	19	12	134
System	<pre>2 Total/Ave.</pre>				108	0	0	0	0	108	19	12	134
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Ione	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
2	CORRIDOR TOILETS	1	1	1,132	1,132	0	0	0	0	1,132	163	15	911
Zone	2 Total/Ave.				1,132	0	0	0	0	1,132	163	15	911
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	, 0	0	0	0	108	19	12	134
System	3 Total/Ave.				6,194	0	0	0	0	6,194	655	14	3,900
Buildin	g				11,256	0	0	0	0	11,256	1,148	14	6,890

ASHRAE 90 ANALYSIS - ALTERNATIVE 1
REPLACE FLUORESCENT BALLASTS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.326 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.169 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 21.38 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
REPLACE FLUORESCENT BALLAST

#### System Totals

Percent	Cool	ing Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.7	3	23	-20,559	15	364	285.0	0	0	0.0	0	0
5 - 10	1.4	6	45	-41,117	17	434	570.0	0	0	0.0	0	0
10 - 15	2.0	3	22	-61,676	21	539	855.0	0	0	0.0	0	0
15 - 20	2.7	6	45	-82,235	14	349	1,140.0	0	0	0.0	0	0
20 - 25	3.4	2	15	-102,793	12	299	1,425.0	0	0	0.0	0	0
25 - 30	4.1	13	90	-123,352	1	23	1,710.0	0	0	0.0	0	0
30 - 35	4.8	3	22	-143,911	1	35	1,995.0	0	0	0.0	0	0
35 - 40	5.4	8	55	-164,469	0	0	2,280.0	0	0	0.0	0	0
40 - 45	6.1	9	65	-185,028	1	36	2,565.0	0	0	0.0	0	0
45 - 50	6.8	3	22	-205,587	0	5	2,850.0	0	0	0.0	0	0
50 - 55	7.5	12	89	-226,145	1	29	3,135.0	0	0	0.0	0	0
55 - 60	8.1	6	45	-246,704	16	394	3,420.0	0	0	0.0	0	0
60 - 65	8.8	6	42	-267,263	0	0	3,705.0	0	0	0.0	0	0
65 - 70	9.5	3	20	-287,821	0	0	3,990.0	0	0	0.0	0	0
70 - 75	10.2	8	60	-308,380	0	0	4,275.0	0	0	0.0	0	0
75 - 80	10.9	0	0	-328,939	0	0	4,560.0	0	0	0.0	0	0
80 - 85	11.5	5	33	-349,497	0	0	4,845.0	0	0	0.0	0	0
85 - 90	12.2	0	0	-370,056	. 0	0	5,130.0	0	0	0.0	0	0
90 - 95	12.9	0	0	-390.615	0	0	5,415.0	0	0	0.0	0	0
95 - 100	13.6	3	25	-411,173	0	0	5,700.0	100	1,070	0.0	0	0
Hours Off	0.0	0	8,042	0	0	6,253	0.0	0	7,690	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1 REPLACE FLUORESCENT BALLAST

					BUIL	DING TEMPERATURE PROFILES
Temperature Range (F)	1	3	1	2	3	Zone Number
Max. Temp. Mo./Hr. Day Type	87.9 7 21 4	7 20	7 21	7 22	8 21	
Above 100 95 - 100 90 - 95 85 - 90 80 - 85 75 - 80 70 - 75 65 - 70 60 - 65 55 - 60 50 - 55 Below 50	1,916 371 530 606 709 660	0 0 132 1,115 1,824 578 352 785 811	471 977 894 662 625 43 193 1,961 973 774 1,187	169 871 1,028 761 731 112 66 2,076 925 792 1,229	0 648 1,258 849 718 199 166 1,946 904 852 1,220	Number of Hours
Min. Temp. Mo./Hr. Day Type	32.5 2 10 4	2 10	54.9 12 2 4		2 20	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1 REPLACE FLUORESCENT BALLASTS

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	2,603	14	534	2
Feb	2,355	14	512	2
March	2,849	14	275	2
April	2,477	14	73	2
May	3,541	34	0	0
June	4,749	36	0	0
July	5,437	37	0	0
Aug	4,965	36	0	0
Sept	3,198	35	0	0
Oct	2,724	14	67	2
Nov	2,477	14	197	2
Dec	2,479	14	437	2
Total	39,855	37	2,096	2

Building Energy Consumption = 30,702 (8tu/Sq Ft/Year) Source Energy Consumption = 61,080 (Btu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
REPLACE FLUORESCENT BALLASTS

----- EQUIPMENT ENERGY CONSUMPTION -----

	Equip -					110111	mry cons	dillactour						
1M	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	0ct	Nov	Dec	Tota
0	LIGHTS													71 10
	ELEC	2600	2352	2848	2476	2724	2724	2476	2848	2476	2724	2476	2476	31,19
	PK	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.
1	MISC LD	•	٨	•	•			<b>A</b>	•	^	^	^	٨	,
	ELEC	0	0	0	0	0	0.0	0 0.0	0	0 0.0	0 0.0	0.0	0 0.0	0.
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	٧.٠
2	MISC LD	•		۰	•	•		•	۸	^	۸	۸	^	,
	GAS	0	0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
3	MISC LD	۸	٥	^	٥	^	^	۸	۸	۸	۸	۸	٥	(
	OIL PK	0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0.6
	PΛ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD	۸	۸	۸	۸	۸	۸	0	0	0	0	0	0	(
	P STEAM PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	r n	0.0	0.0	V.V	0.0	0.0	V.V	٧.٠	V.V	0.0	0.0	0.0	0.0	0
5	MISC LD	•	۸	۸	٥	Δ		۸	٨	۸	٨	۸	۸	(
	P HOTH20 PK	0 0.0	0 0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0.0
	rn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	V.V	V. (
6	MISC LD	٥	^	۸	۸	۸	۸	۸	۸	۸	۸	٥	٥	(
	P CHILL PK	0 0.0	0 0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0.0
		V.V	٠				۷.۷	0.0	0.0	0.0	0.0	0.0	V. V	V.V.
1	EQ1161	^		CLD COND			1077	0100	1710	000	۸	۸	Δ	5 14
	ELEC PK	0 0.0	0.0	0 0.0	0.0	250 16.8	1273 17.6	2102 18.2	1312 17.6	208 17.0	0 0.0	0 0.0	0 0.0	5,146 18.2
	rn	0.0	0.0	0.0	0.0	10.6	17.0	10.2	17.0	17.0	V.V	0.0	V.V	10.7
1	EQ5200	•		ENSER FA		07	7	007	107	00	٨	۸	۸	40
	ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	26 0.6	117 1.4	203 1.6	123 1.4	22 1.1	0 0.0	0 0.0	0 0.0	49 1.
	71	0.0	0.0	0.0	0.0	0.0	1.4	1.0	1.4	1.1	0.0	0.0	0.0	1.0
1	EQ5303		CONT									_		
	ÉLEC	0	0	0	0		59			10				20
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161			CLD COND										
	ELEC	0		0	0	0	19		29			0		10
	PK	0.0	0.0	0.0	0.0	0.5	0.5	0.6	0.5	0.5	0.0	0.0	0.0	0.6
2	EQ5200			ENSER FA	NS									
	ELEC	0		0	0		2			0		0		1
	PK	0.0	0.0	0.0	0.0		0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
							_							

	ne Air Condit Trane Custom			Network										V 600 Page 12
	IPMENT ENERGY .ace fluoresc			TERNATIV	E 1									·
	ELEC	0	0	0	0	0	32	60	41	5	0	0	0	138
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
i	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	0	0	0	0	520	520	472	543	472	0	0	0	2,527
	PK	0.0	0.0	0.0	0.0	2.4	2.4	2.4	2.4	2.4	0.0	0.0	0.0	2.4
2	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	0	0	0	0	3	3	3	4	3	0	0	0	17
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2102		PURC	HASED DI	ST. HOT I	NATER								
	P HOTH20	534	512	275	73	0	0	0	0	0	67	197	437	2,096
	PK	2.3	2.3	2.3	2.3	0.0	0.0	0.0	0.0	0.0	2.3	2.3	2.3	2.3
1	EQ5020		HEAT	WATER C	IRC. PUM	C.V.								
	ELEC	3	3	2	1	0	0	0	. 0	0	1	1	3	13
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

## UTILITY PEAK CHECKSUMS - ALTERNATIVE 1 REPLACE FLUORESCENT BALLASTS

 UTILITY P	PEAK CHECKS	S U M S
		0 0 1, 0

Utility	ELECTRIC	DEMAND
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Peak Value 36.9 (kW)
Yearly Time of Peak 15 (hr) 7 (mo)

#### Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Utili Demai Equipment Description (ki	
Cooling E	Equipment		
1 2	EQ1161 EQ1161	AIR-CLD COND COMP <15 TONS 20 AIR-CLD COND COMP <15 TONS 0	
Sub Total	1	21	0 56.90
Sub Total		0	0 0.00
Air Movin	ng Equipment		
1 2			4 6.40 0 0.04
Sub Total	L	2.	4 6.44
Sub Total		0.	0 0.00
Miscellan	neous		
Lights Base Uti Misc Equ Sub Total	ripment		0 0.00 0 0.00
Grand Tot	al	36.	9 100.00

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****************************
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**
       TRACE 600
                ANALYSIS
**
**
       by
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 45

Weather File Code:

CARLISLE

Location:

ENERGY SAVINGS OPPORTUNITY STUDY

Latitude:

40.2 (deg)

Longitude:

77.2 (deg)

Time Zone:

5 475 (ft)

Elevation: Barometric Pressure:

29.2 (in. Hg)

Summer Clearness Number:

1.00

Winter Clearness Number:

1.00

Summer Design Dry Bulb:

92 (F)

Summer Design Wet Bulb:

72 (F)

Winter Design Dry Bulb:

Summer Ground Relectance:

4 (F) 0.20

Winter Ground Relectance:

0.20

Air Density:

0.0742 (Lbm/cuft)

Air Specific Heat:

0.2444 (8tu/lbm/F)

Density-Specific Heat Prod:

1.0882 (Btu-min./ar/cuft/F)

Latent Heat Factor:

4,790.2 (8tu-min./hr/cuft)

Enthalpy Factor:

4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May

To September

System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run:

14:20:59 1/26/94

Dataset Name:

CB45B .TM

AIRFLOW - ALTERNATIVE 2
REPLACE FLUORESCENT FIXTURES

------SYSTEM SUMMARY ------(Design Airflow Quantities)

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	0	5,519	5,519	6,717	1,198	0	0
2	PTAC	0	179	179	234	55	0	0
3	RAD	0	0	0	0	1,640	0	0
Totals		0	5,698	5,698	6,951	2,893	0	0

CAPACITY - ALTERNATIVE 2
REPLACE FLUORESCENT FIXTURES

			Coo	ling					Heating			
System Number	System Type	Capacity		Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (8tuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (8tuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	SZ	12.8	0.0	0.0	12.8	-171,332	0	0	0	0	0	-171,332
2	PTAC	0.4	0.0	0.0	0.4	-7,403	0	0	0	0	0	-7,403
3	RAD	0.0	0.0	0.0	0.0	-232,438	0	0	0	0	0	-232,438
Totals		13.2	0.0	0.0	13.2	-411.173	0	0	0	0	0	-411,173

The building peaked at hour 16 month 7 with a capacity of 13.2 tons

ENGINEERING CHECKS - ALTERNATIVE 2
REPLACE FLUORESCENT FIXTURES

----- ENGINEERING CHECKS -----

			Percent		Cool	ing	Heat			
1	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft
1	Main	SZ	0.00	1.11	431.1	387.0	31.01	1.11	-34.58	4,954
2	Main	PTAC	0.00	1.65	400.3	241.9	49.61	1.65	-68.55	108
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-37.53	6,194

System 1 Peak SZ - SINGLE ZONE

					******	******				***** HEAT			****
Peaked a			Mo/Hr:		_			/Hr:			Mo/Hr: 13,		
Outside	Alr ==>	UA	DB/WB/HR:	91/ 73/ 98.	0		* 0	ADB:	91 *		OADB:	<b></b>	
		Space	Ret Dir	Ret. Air	Net	Percnt	* 9	oace	Percnt *	Space Pea	k Coil P	eak Pa	ercnt
		Sens.+Lat.	Sensible	Latent	Total				Of Tot *	•			f Tot
Envelope		(Btuh)	(Btuh)		(Btuh)	(%)		tuh)	(%) *	-			(%)
Skylit		0	0	(,	0	0.00		0	0.00 *		Ó	•	0.00
Skylit		0	0		0	0.00		0	0.00 *		0		0.00
Roof C		22,074	0		22,074			074	19.18 *		8 -18,		10.60
Glass	Solar	17,987	0		17,987	11.71	* 17	987	15.63 *		0	0	0.00
Glass	Cond	3,619	0		3,619	2.36	* 3	619	3.14 *	-17,05	2 -17,0	)52	9.95
Wall C	ond	26,577	0		26,577	17.30	* 26	577	23.09 *	-52,66	0 -52,6	660 3	30.74
Partit	ion	0			0	0.00	*	0	0.00 *	(	0	0	0.00
Expose	d Floor	0			0	0.00	*	0	0.00 *	(	0	0	0.00
Infilt	ration	44,113			44,113	28.72	* 20	,213	17.56 *	-83,46	1 -83,4	61 4	48.71
Sub To	tal::>	114,370	0		114,370	74.45	* 90	470	78.61 *	-171,333	2 -171,	332 10	00.00
Internal	Loads						*		*				
Lights		14,977	0		14,977	9.75		977	13.01 *		0	0	0.00
People		20,341			20,341	13.24		,635	8.37 *		0	0	0.00
Misc		0	0	0	0	0.00		0	0.00 *		0	0	0.00
Sub To	tal::>	35,318	0	0	35,318	22.99		612	21.39 *		0	0	0.00
Ceiling		0	0		0	0.00		0	0.00 *		0	0	0.00
Outside		0	0	0	0	0.00		0	0.00 *		0	0	0.00
Sup. Fan					3,925	2.55			0.00 *			0	0.00
Ret. Fan			0		0	0.00			0.00 *			0	0.00
Duct Hea		•	0		0	0.00		•	0.00 *			0	0.00
OV/UNDR		0			0	0.00		0	0.00 *		0		0.00
Exhaust			0	0	0	0.00			0.00 *				0.00
Terminal	Bypass		0	0	0	0.00	*		0.00 *			0	0.00
Grand To	+-1>	149,688	0	0	157 (10	100.00	* 115	082	•		2 -171,3	(32 10	00.00
GIANU IU	td1/	147,000	V	V	133,612	100.00	, 11J	002	100.00	1/1,55	2 1/1,	132 10	JV. UC
			coo										
			Sens Cap.							Gross Total		s (sf)	(%)
	(Tons)		(Mbh)	(cfm)	-		-		Grains	Floor			
Main Clg	12.8		119.0	5,519	75.0 62			53.5		Part	0		
Aux Clg	0.0		0.0	0		).0 0.		0.0		Exflr	0		
Opt Vent	0.0		0.0	0	0.0	0.0	0.0	0.0	0.0	Roof	4,954	0	
Totals	12.8	153.6								Wall :	3,329	4/3	14
	HEATI	NG COIL SEL	ECTION		AIR	IFLOWS (c1	fm)	{	ENGINEERING	CHECKS	TEMPERAT	TURES (F	F)
			irfl Ent			Cooling	Heating	Cle	3 % OA	0.0	Type	Clg	Htg
		) (cf			Vent	ō	0	Cle	cfm/Sqft	1.11	SADB	_	96.5
Main Htg	-171			96.5	Infil	1.198	1.198	Clo	g Cfm/Ton		Plenum		68.0
Aux Hta	0	.0	0.0	0.0	Supply	5,519	5,519	Cle	g Sqft/Ton		Return	75.0	68.0
Preheat	-0	.0 5,	519 68.0	55.2	Mincfm	0	0		g Btuh/Sqft		Ret/OA	75.0	68.0
Reheat	0	. 0	0.0	0.0	Return	5,519	5,519		. People		Runarnd	75.0	68.0
Humidif	0	. 0	0 0.0	0.0	Exhaust	0	0		g % OA		fn MtrTD	0.2	0.0
Opt Vent	0		0.0	0.0	Rm Exh	0	0		g Cfm/SqFt		Fn BldTD	0.1	0.0
Total	-171	. 3			Auxil	0	0	Ht	g Btuh/SqFt	-34.58	Fn Frict	0.4	0.0

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

	t Time ==:		Mo/Hr:									Mo/Hr: 1		
Outside	Air ==>	0A	DB/WB/HR: '	91/ 74/105.	0		*	0	ADB:	91 *		OAD8:	4	
		Space	Ret. Air	Ret. Air	Net	Percn	t *	S	pace	Percnt *	Space Pea	ak Coil	Peak	Perch
	Se	ens.+Lat.	Sensible	Latent	Total	. Of To	t *	Sens	ible	Of Tot *	Space Ser			Of To
Envelope	Loads	(8tuh)	(Btuh)	(Btuh)	(Btuh)	(%	* (	(B	tuh)	(%) *	(Btul	1) (8	tuh)	(%
Skylit	e Solr	0	0		(	0.00	) *		0	0.00 *		0	0	0.0
Skylit	e Cond	0	0		(	0.0	) *		0	0.00 *		0	0	0.0
Roof C	ond	416	0		416	7.76	<b>5</b> *		477	11.86 *	-39	96	-396	5.3
Glass	Solar	784	0		784	14.6	<b>*</b>		765	19.03 *		0	0	0.0
Glass	Cond	136	0		136	2.5	3 *		145	3.61 *	-68	39	-689	9.3
Wall C	ond	1,450	0		1,450	27.0	<b>5</b> *	1	,531	38.08 *	-2,47	74 -2	, 474	33.4
Partit	ion	0			(	0.00	) *		0	0.00 *		0	0	0.0
	d Floor	0			. (	0.00	) *		0	0.00 *		0	0	0.0
Infilt		2,384			2,384				931	23.15 *		14 -3	,844	51.9
Sub To		5,169	0		5,169			3	,849	95.74 *	•		,403	100.0
Internal		-,/	•		-,		*	_	•	*				
Lights		163	0		163	3.0	<b>;</b> *		171	4.26 *		0	0	0.0
People		0	·		(				0	0.00 *		0	0	0.0
Misc		0	0	0	(		) *		0	0.00 *		0	0	0.0
	tal==>	163	0	0	163		[ *		171	4.26 *		0	0	0.0
Ceiling		0	0	•	(		*		0	0.00 *		0	0	0.0
Outside		0	0	0	(				0	0.00 *		0	0	0.0
Sup. Fan		•	•	•	25		7 *			0.00 *			0	0.0
Ret. Fan			0		(					0.00 *			0	0.0
Duct Hea			0		(					0.00 *			0	0.0
OV/UNDR	-	0	•		(				0	0.00 *		0	0	0.0
Exhaust		•	0	0	(					0.00 *			0	0.0
Terminal			0	0	(					0.00 *			0	0.0
	-7:						‡			*				
Grand To	tal==>	5,332	0	0	5,358	100.00	*	4	,020	100.00 *	-7,40	)3 -7	,403	100.0
										B/₩8/HR	Gross Tota	al Gla	3S (S1	f) (%)
			(Mbh)					-		Grains	Floor	108		
ain Clg	0.4	5.4	3.9	179	75.1 6	2.5	6.5	54.3			Part	0		
ux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		ExFlr	0		
pt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	108		0
otals	0.4	5.4									Wall	153		19 1
	HEATING	COIL SEL	ECTION							ENGINEERING		TEMPER		
	Capacity	Coil A	irfl Ent	Lvg		Cooling		Heating		g % OA	0.0	Type	Clg	
	(Mbh)		m) Deg F	-	Vent			0		g Cfm/Sqft		SAD8		3 106.
ain Htg	-7.4				Infil	55		55		g Cfm/Ton		Plenum		0, 68.
ux Htg	0.0	)	0.0	0.0		. 179		179		g Sqft/Ton		Return	75.0	
reheat	-0.0			54.2	Mincfm	(	)	0		.g Btuh/Sqft		Ret/OA	75.(	
eheat	0.0	)	0 . 0.0	0.0	Return	179	7	179		. People		Runarnd	75.0	
umidif	0.0		0.0	0.0	Exhaust	(	)	0		.g % OA	0.0	Fn MtrTD		
pt Vent	0.0	)	0.0	0.0	Rm Exh	(	)	0		g Cfm/SqFt		Fn BldTD		
otal	-7.4	ı			Auxil	(	,	0	11.3	g Btuh/SqFt	/0 55	Fn Frict	Λ :	1 0.

System 3 Block RAD - RADIATION

Peaked at Ti			Mo/Hr:	•			*		/Hr: (	)/ 0 *		Mo/Hr: 1		
Outside Air	::>	0A	DB/WB/HR:	0/ 0/ 0.	0		*	. 0	ADB:	0 *		OAD8:	4	
		Space	Ret. Ai	r Ret. Air	Net	t Per	cnt *	S	pace	Percnt *		ak Coil	Peak	Percnt
	Se	ns.+Lat.	Sensible		Total		Tot *	Sens	-	Of Tot *				Of Tot
Envelope Loa		(Btuh)	(Btuh		(Btuh		(%) *		tuh)	(%) *	•		tuh)	(%)
Skylite So		Ó	,	o ` í			.00 *		Ó	0.00 *		0	Ö	0.00
Skylite Co		0	(	)	(		.00 *		0	0.00 *		0	0	0.00
Roof Cond		0	1	)	(	0 0	.00 *		0	0.00 *	-22,7	03 -22	,703	9.77
Glass Sola	r	0	•	)	(	0 0	.00 *		0	0.00 *		0	0	0.00
Glass Cond		0	(	)	(	0 0	.00 *		0	0.00 *	-23,5	98 -23	,598	10.15
Wall Cond		0	(	)	(	0 0	.00 *		0	0.00 *	-71,9	27 -71	,927	30.94
Partition		0			(	0 0	.00 *		0	0.00 *		0	0	0.00
Exposed Fl	.00r	0			(	0 0	* 00.		0	0.00 *		0	0	0.00
Infiltrati		0			(	0 (	.00 *		0	0.00 *	-114,2	10 -114	,210	49.14
Sub Total=		0	(	)	(		.00 *		0	0.00 *				100.00
Internal Loa							*			*				
Lights		0		)	(	0 0	* 00.0		0	0.00 *		0	0	0.00
People		0			(		.00 *		0	0.00 *		0	0	0.00
Misc		0	(	) 0	(		.00 *		0	0.00 *		0	0	0.00
Sub Total=	1)	0	(	) 0	(	0 0	.00 *		0	0.00 *		0	0	0.00
Ceiling Load		0	(	)	(		.00 *		0	0.00 *		0	0	0.00
Outside Air		0	(	) 0	(		.00 *		0	0.00 *		0	0	0.00
Sup. Fan Hea	t	-			(	0 0	.00 *			0.00 *			0	0.00
Ret. Fan Hea			(	)	(		.00 *			0.00 *			0	0.00
Duct Heat Pk			(	)	(	0 0	.00 *			0.00 *			0	0.00
OV/UNDR Sizi		0			(		.00 *		0	0.00 *		0	0	0.00
Exhaust Heat		·	(	) 0	(	0 0	.00 *			0.00 *			0	0.00
Terminal Byp			(	) 0	(	0 (	.00 *			0.00 *			0	0.00
-74							*			į.				
Grand Total=	<b>:</b> >	0	(	) 0	(	0	.00 *		0	0.00 *	-232,4	38 -232	,438	100.00
			co	DLING COIL S	ELECTION							AREAS-		
Ţ	otal C	apacity	Sens Cap.	Coil Airfl	Enteri	ing DB	/W8/HR	Lea	ving DE	s/₩B/HR	Gross Tot	al Gla	ss (st	f) (%)
(1	ons)	(Mbh)	(Mbh)	(cfm)	Deg F De	eg F	Grains	Deg F	Deg F	Grains	Floor	6,194		
1ain Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0		
Aux Clg	0.0	0.0	0.0	0		0.0	0.0	0.0	0.0	0.0	ExFlr	0		
]pt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	6,194		0 0
Totals		0.0									Wall	4,555	6	655 14
Н	EATING	COIL SEL	ECTION	·	AI	RFLOW	S (cfm)		8	NGINEERING	CHECKS		ATURES	S (F)
Ca	pacity	Coil A	irfl Ent	Lvg	Type	Cool	ing	Heating	Clo	; % OA	0.0	Type	Clg	Htg
		(cfi			Vent		0	0	Clo	Cfm/Sqft	0.00	SADB	0.0	68.1
	-232.4				Infil		0	0 1,640	Clg	Cfm/Sqft Cfm/Ton	0.00	Plenum	0.0	68.0
	0.0		0 0.0	0.0	Supply		0	0	Clg	Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0		0.0		Minofm		0	0	Clg	Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Reheat	0.0		0 0.0		Return		0	0	_	People	0	Runarnd	0.0	
	0.0		0 0.0		Exhaust		0	0	Htg	, % OA	0.0	Fn MtrID	0.0	
	0.0		0 0.0		Rm Exh		0	0		Cfm/SqFt	0.00	Fn BldTD		
•	-232.4				Auxil		. 0	0		Btuh/SqFt		Fn Frict		

BUILDING U-VALUES - ALTERNATIVE 2 REPLACE FLUORESCENT FIXTURES

												Room Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	<ol> <li>Total/Ave.</li> </ol>	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
2	CORRIDOR TOILETS	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	<ol><li>3 Total/Ave.</li></ol>	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	32.0	9.63
Buildin	g	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	31.5	9.54

BUILDING AREAS - ALTERNATIVE 2
REPLACE FLUORESCENT FIXTURES

------ BUILDING AREAS -----

Room Number	Description	Numbe Dupli Flr		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	<pre>1 Total/Ave.</pre>				4,954	0	0	0	0	4,954	473	14	2,855
System	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	<pre>2 Total/Ave.</pre>				108	0	0	0	0	108	19	12	134
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	<pre>1 Total/Ave.</pre>				4,954	0	0	0	0	4,954	473	14	2,855
2	CORRIDOR TOILETS	1	1	1,132	1,132	0	0	0	0	1,132	163	15	911
Zone	<pre>2 Total/Ave.</pre>				1,132	0	0	0	0	1,132	163	15	911
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	3 Total/Ave.				6,194	0	0	0	0	6,194	655	14	3,900
Buildin	g				11,256	0	0	0	0	11,256	1,148	14	6,890

ASHRAE 90 ANALYSIS - ALTERNATIVE 2 REPLACE FLUORESCENT FIXTURES

----- A S H R A E 9 O A N A L Y S I S ------

Overall Roof U-Value = 0.057 (8tu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.326 (8tu/Hr/Sq Ft/F)
Overall Building U-Value = 0.169 (8tu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 21.38 (Btu/Hr/Sq Ft) SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 REPLACE FLUORESCENT FIXTURES

## System Totals

Percent	Cool	ling Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity		Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.7	6	41	-20,559	14	347	284.9	0	0	0.0	0	0
5 - 10	1.3	3	22	-41,117	15	373	569.8	0	0	0.0	0	0
10 - 15	2.0	0	0	-61,676	23	567	854.7	0	0	0.0	0	0
15 - 20	2.6	7	45	-82,235	15	382	1,139.5	0	0	0.0	0	0
20 - 25	3.3	8	53	-102,793	12	295	1,424.4	0	0	0.0	0	0
25 - 30	4.0	10	68	-123,352	1	25	1,709.3	0	0	0.0	0	0
30 - 35	4.6	3	22	-143,911	2	38	1,994.2	0	0	0.0	0	0
35 - 40	5.3	11	76	-164,469	1	16	2,279.1	0	0	0.0	0	0
40 - 45	6.0	4	28	-185.028	0	0	2,564.0	0	0	0.0	0	0
45 - 50	6.6	9	65	-205,587	2	41	2,848.9	0	0	0.0	0	0
50 - 55	7.3	7	46	-226,145	1	29	3,133.7	0	0	0.0	0	0
55 - 60	7.9	10	68	-246,704	16	394	3,418.6	0	0	0.0	0	0
60 - 65	8.6	3	19	-267,263	0	0	3,703.5	0	J	0.0	0	0
65 - 70	9.3	6	40	-287,821	0	0	3,988.4	0	0	0.0	0	0
70 - 75	9.9	6	40	-308,380	0	0	4,273.3	0	0	0.0	0	0
75 - 80	10.6	3	18	-328,939	0	0	4,558.2	0	0	0.0	0	0
80 - 85	11.3	2	15	-349,497	0	0	4,843.1	0	0	0.0	0	0
85 ~ 90	11.9	0	0	-370,056	0	0	5,127.9	0	0	0.0	0	0
90 - 95	12.6	0	0	-390,615	0	0	5,412.8	i)	0	0.0	0	0
95 - 100	13.2	4	25	-411,173	0	0	5,697.7	100	1,070	0.0	0	0
Hours Off	0.0	0	8,069	0	0	6,253	0.0	0	7,690	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 REPLACE FLUORESCENT FIXTURES

					BUIL	DING TEMPERATURE PROFILES
Temperature Range (F)	1	3	 1	2	3	Zone Number
Max. Temp. Mo./Hr. Day Type	87.9 7 21 4	7 20	7 22	7 22	8 21	
						Number of Hours
Above 100	0	-	312	139	0	
95 - 100	0	0	1,065	767	593	
90 <b>~ 9</b> 5	0	0	896	1,074	1,246	
85 - 90	136			800	903	
80 - 85		1,115		776	713	
75 - 80		1,824			217	
70 - 75	358				166	
65 - 70	415			2,057	1,930	
60 - 65	720				920	
55 - 60	644				852	
50 - 55	689			1,229	1,220	
Below 50	2,603	2,476	0	0	0	
Min. Temp.	32.5	33.1	54.9	55.0	54.9	
Mo./Hr.		2 10			2 6	
Day Type	4		4		2	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2 REPLACE FLUORESCENT FIXTURES

DMND
Peak
m/hr)
2
2
2
2
0
0
0
0
0
2
2
2
2

Building Energy Consumption = 29,423 (8tu/Sq Ft/Year)
Source Energy Consumption = 56,517 (8tu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 REPLACE FLUORESCENT FIXTURES

------ EQUIPMENT ENERGY CONSUMPTION-------

	Equip -						-							
um	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS													
	ELEC	2160	1955	2366	2057	2263	2263	2057	2366	2057	2263	2057	2057	25,924
	PK	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
1	MISC LD													
	ELEC	, 0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD	_												
	GAS	0	0	0	Ů	0	0	0	0	0	0	0	0	(
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD	٥	٥	٥	•	•		•				_	_	_
	OIL PK	0.0	0 0.0	0	0	0	0	0	0	0	0	0	0	(
	rn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD	۸	^	•	•	•		•				_	_	_
	P STEAM PK	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0	0 .	0	0	0
	rn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD				_									
	P HOTH20	0 0.0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD	۸	^		•		•	_	_	_				
	P CHILL PK	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0	0	0
	ΓÑ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
į	EQ1161	•		CFD COND										
	ELEC PK	0 0.0	0.0	0.0	0 0.0	196	1196	2028	1226	161	0	0	0	4,807
	PN	0.0	0.0	0.0	0.0	15.4	17.1	17.7	17.2	16.6	0.0	0.0	0.0	17.7
į	EQ5200	٨		ENSER FA										
	ELEC PK	0 0.0	0			21		195			0	0	0	459
	71	0.0	0.0	0.0	0.0	0.6	1.3	1.6	1.3	1.0	0.0	0.0	0.0	1.6
	EQ5303	_	CONT											
	ELEC	0	0	0			59		62		0	0	0	202
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161			CLD COND										
	ELEC	0	0	0	0	0		54		1	0	0	0	102
	PK	0.0	0.0	0.0	0.0	0.5	0.5	0.6	0.5	0.5	0.0	0.0	0.0	0.6
	EQ5200		COND	ENSER FA										
	ELEC	0	0					5			0	0	0	10
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1

													V 600 Page 25	
	IPMENT ENERGY LACE FLUORESC			TERNATIV	E 2									
	ELEC	0	0	0	0	0	32	60	41	5	0	0	0	138
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	0	0	0	0	520	520	472	543	472	0	0	0	2,527
	PK	0.0	0.0	0.0	0.0	2.4	2.4	2.4	2.4	2.4	0.0	0.0	0.0	2.4
2	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	0	0	0	0	3	3	3	4	3	0	0	0	16
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2102		PURC	HASED DI	ST. HOT W	NATER								
	P HOTH20	542	519	285	78	0	0	0	0	0	74	203	444	2,145
	PK	2.3	2.3	2.3	2.3	0.0	0.0	0.0	0.0	0.0	2.3	2.3	2.3	2.3
1	EQ5020		HEAT	WATER C	IRC. PUMA	P C.V.								
	ELEC	3	3	2	1	0	0	0	0	0	1	1	3	13
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2
REPLACE FLUORESCENT FIXTURES

-----UTILITY PEAK CHECKSUMS-----

## Utility ELECTRIC DEMAND

Peak Value 34.1 (kW)Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Utilit Demand Equipment Description (kW	
Cooling E	quipment		
1 2	EQ1161 EQ1161	AIR-CLD COND COMP <15 TONS 19.0 AIR-CLD COND COMP <15 TONS 0.0	
Sub Total		20	60.08
Sub Total		0.0	0.00
Air Movin	g Equipment		
1 2	,	SUMMATION OF FAN ELECTRICAL DEMAND 2.4 SUMMATION OF FAN ELECTRICAL DEMAND 0.0	
Sub Total		2.4	6.97
Sub Total		0.0	0.00
Miscelland	eous		
Lights Base Util Misc Equi Sub Total			0.00
Grand Tota	al	34.1	100.00

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 45

Weather File Code: CARLISLE

Location: ENERGY SAVINGS OPPORTUNITY STUDY

Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5

Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (lbm/cuft)
Air Specific Heat: 0.2444 (8tu/lbm/f)

Density-Specific Heat Prod: 1.0882 (8tu-min./hr/cuft/F)
Latent Heat Factor: 4.790.2 (8tu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May

To September
System Simulation Period: January

To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14:32: 7 1/26/94

Dataset Name: CB45B .TM

AIRFLOW - ALTERNATIVE 3 COMBINED ECOS

					Auxil.	Room		
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	0	5,519	5,519	6,285	766	0	0
2	PTAC	0	84	84	120	35	0	0
3	RAD	0	0	0	0	1,048	0	0
Totals		0	5,603	5,603	6,404	1,849	0	0

CAPACITY - ALTERNATIVE 3 COMBINED ECOS

		Coo	ling					Heating			
System Syste Number Typ	m Capacity	Aux. Sys. Capacity (Tons)		Cooling Totals (Tens)	Main Sys. Capacity (8tuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (8tuh)	Heating Totals (Btuh)
1 SZ	7.9	0.0	0.0	7.9	-89,100	0	0	0	0	0	-89.100
2 PTAC	0.2	0.0	0.0	0.2	-3,811	0	0	0	0	0	-3.811
3 RAD	0.0	0.0	0.j	0.0	-121,163	0	0	0	0	0	-121,163
Totals	8.1	0.0	0.9	8.1	-214,074	0	0	0	0	0	-214,074

The building beaked at hour 16 month 7 with a capacity of 8.1 tons

ENGINEERING CHECKS - ALTERNATIVE 3 COMBINED ECOS

------ ENGINEERING CHECKS

			Percent		Cool:	ing		Heat			
System Number	Main/ Auxiliary	System Type	Outside Air	Ofm/ Sq Ft	€fm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft	
1	Main	SZ	0.00	1.11	699.5	627.9	19.11	1.11	-17.99	4,954	
2	Main	PTAC	0.00	0.78	342.4	438.5	27.37	0.78	-35.29	108	
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-19.56	6,194	

System 1 Peak SZ - SINGLE ZONE

******	********	****** C	OOLING COIL	. PEAK ****	*******								******
	t Time ==		Mo/Hr:	7/16 91/ 73/ 98.	^		* Mo.				Mo/Hr:		
0012108	HII/	UH	אח/מא/סע;	71/ 73/ 78.	U		* 0	ADB: '	91 * *		OADB:	4	
		Space	Ret. Air	Ret. Air	Net	Percnt	* S	pace	· · · · · · · · · · · · · · · · · · ·		eak Coil	Peak	Percnt
	S	ens.+Lat.	Sensible		Total			ible	Of Tot *			Sens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)				(%) *	•	ıh) (dı		(%)
Skylite		0			0			0	0.00 *	•		0	0.00
Skylite	e Cond	0	0	1	0	0.00			0.00 *		0	0	0.00
Roof Co	ond	8,689	0	1	8,689	9.18		,689	12.09 *	-8,4	164 -	8.464	9.50
Glass S	Solar	17,987	0		17,987			,987	25.02 *			0	0.00
Glass (	Cond	3,619	0	ı	3,619	3.82	* 3	619	5.03 *			7,052	19.14
Wall Co	ond	4,072	0	ı	4,072			,072	5.66 *	-10.2	261 -1		11.52
Partiti	ion	0			0		*	0	0.00 *				0.00
Exposed	d Floor	0			0	0.00	*	0	0.00 *		0	0	0.00
Infilt	ration	21,073			21,073	22.26	* 12.	,914	17.96 *	-53.3	322 -5		59.85
Sub To	tal==>	55,440	0	ı	55,440	58.55		,281		-89.1	100 -8	9.100	100.00
Internal	Loads							,	*		•	.,	
Lights		14,977	0		14,977	15.82	* 14.	,977	20.83 *		0	0	0.00
People		20,341			20,341				13.40 +		0	0	0.00
Misc		0	0	0	0				0.00 *		0	0	0.00
Sub Tot	tal==>	35,318	0	0	35,318	37.30			34.23 *		0	0	0.00
Ceiling t	Load	0	0		0		*	0	0.00 *		0	0	0.00
Outside #	Air	0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
Sup. Fan	Heat				3,925	4.15			0.00 #			0	0.00
Ret. Fan	Heat		0		0	0.00	*		0.00 \$			0	0.00
Duct Heat	t Pkup		0		0	0.00	*		0.00 *			0	0.00
OV/UNDR S	Sizing	0			0	-0.00	*	0	-0.00 *		0	0	0.00
Exhaust h	Heat		0	0	0	0.00	*		0.00 *			0	0.00
Terminal	Bypass		0	0	0	0.00	*		0.00 *			0	0.00
							*		*				
Grand Tot	tal==>	90.758	0	0	94,682	100.00	* 71,	,893	100.00 *	-89,1	.00 -8	9,100	100.00
			coo	LING COIL S	ELECTION						AREAS		
	Total (	Capacity	Sens Cap.	Coil Airfl	Enterin	ng DB/WB/H	R Leav	∕ing D8	3/W8/HR	Gross Tot			
		(Mbh)	(Mbh)	(cfm)	Deg F Deg	g F Grain	s Deg F	Deg F	Grains	Floor		,	, , ,
	7.9	94.7	75.8	5,519	75.0 69	5.7 82.	4 62.4	60.4	77.6	Part	0		
Aux Clg	0.0	0.0	0.0	0		0.0 0.	0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0		0.0	0.	0.0 (	0.0	0.0	0.0	0.0	Roof	4,954		0 0
Totals	7.9	94.7								Wall			173 14
	HEATING	COIL SEL	ECTION			RFLOWS (cf	m)	8	ENGINEERING	CHECKS	TEMPE	RATURES	(F)
	Capacity	/ Coil A	irfl Ent	Lvg			Heating		) % OA		Type	Clg	
	(Mbh)	(cfi	•	Deg F			0		Cfm/Sqft		SADB	63.0	-
Main Htg	-89.1			82.8	Infil	766	766	Clg	Cfm/Ton	699.48	Plenum	75.0	
Aux Htg	0.0	)	0.0	0.0	Supply		5,519	Clg	Sqft/Ton	627.87	Return	75.0	
Preheat	-0.0			62.4	Minofm	0	0	Clg	, 3tuh∕Sqft	19.11	Ret/OA	75.0	
Reheat	0.0	)	0 0.0	0.0	Return		5,519		People	42	Runarnd		
Humidif	0.0	)	0.0	0.0	Exhaust	0	0	Нtg	; % OA		Fn MtrI		
Opt Vent Total	0.0 -89.1		0.0	0.0	Rm Exh Auxil	0 0	0	Нtg	Cfm/SqFt	1.11	Fn BldT	0.1	0.0

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

	t Time ==		Mo/Hr:				*	Mo/Hr:	7/16	*	Mo/Hr: 13	3/ 1	
Outside	Air ==>	04	ADB/WB/HR:	91/ 74/105.	0		*	OADB:	•	<b>*</b>	OAD8:		
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Space	Percnt	≭ * Space Pea	ak Coil F	لاده(	Percnt
	9	Sens.+Lat.	Sensible	Latent	Total			Sensible	Of Tot	•			Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)			(Btuh)	(%)	•			(%)
Skylit	e Solr	0	0		0			Ò	0.00	•		0	0.00
Skylit	e Cond	0	0		0	0.00	*	0	0.00		0	0	0.00
Roof C	ond	134	0		134	4.53	*	188	8.96			185	4.84
Glass	Solar	784	0		784	26.53	*	765	36.40			0	0.00
Glass		136	0		136	4.59	*	145	6.91			-689	18.08
Wall C		204	0		204	6.91	*	237	11.29			482	12.65
Partit	ion	0			0		*	0	0.00			0	0.00
Expose	d Floor	0			0	0.00	*	0	0.00		0	Ō	0.00
Infilt	ration	1,523			1,523	51.53	*	595	28.30	-2,45	i6 <b>-2</b> ,	456	64.43
Sub To		2,781	0		2,781	94.08	*	1,930	91.85	-3,81		811	100.00
Internal							*		,		-,	– <del>-</del>	
Lights		163	Û		163	5.52	*	171	8.15	k.	0	0	0.00
People		0			0	0.00	*	0	0.00	t	0	0	0.00
Misc		0	0	0	0	0.00	*	0	0.00	•	0	0	0.00
Sub To		163	0	0	163	5.52	*	171	8.15	<b>t</b>	0	0	0.00
Ceiling		0	0		0	0.00	*	0	0.00	<b>\$</b>	0	0	0.00
Outside (		0	0	0	0	0.00	*	0	0.00	<b>K</b>	0	0	0.00
Sup. Fan					12	0.41	*		0.00	ķ.		0	0.00
Ret. Fan			0		0	0.00	*		0.00	(		0	0.00
Duct Hear			0		0				0.00	t		0	0.00
OV/UNDR S	-	0			0			0	0.00	•	0	0	0.00
Exhaust			0	•	0				0.00	(		0	0.00
Terminal	Bypass		0	0	0	0.00			0.00	•		0	0.00
A		2.2.4					*		1				
Grand 101	tal==>	2,944	0	0	2,956	100.00	*	2,102	100.00 *	-3,81	1 -3,	811	100.00
											AREAS		
			Sens Cap.			ng D8/W8/	HR	Leaving	DB/WB/HR	Gross Tota			) (%)
			(Mbh)					F Deg	F Grains	Floor	108	`	, , ,
fain Clg	0.2			84	75.1 63	2.5 66	.5 52	.0 50.	1 52.0	Part	0		
Aux Clg	0.0	0.0	0.0	0				.0 0.	0.0	ExFlr	0		
)pt Vent	0.0	0.0	0.0	0.	0.0	0.0	.0 0	.0 0.	0.0	Roof	108		0 0
otals (	0.2	3.0								Wall	153		19 12
	HEATIN	G COIL SEL	ECTION			RFLOWS (c	fm)		-ENGINEERING	CHECKS	TEMPERA	TURES	(F)
	Capacit				Type	Cooling	Heati		lg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cf	m) Deg F	Deg F	Vent	Õ		-	lg Cfm/Sqft		SADB	52.1	_
fain Htg	-3.		84 68.0	109.5	Infil	35			lg Cfm/Ton		Plenum	75.0	
ux Htg	0.	0	0.0	0.0	Supply	84			lg Sqft/Ton		Return	75.0	
reheat	-0.	0	84 68.0	52.0	Mincfm	0			lg Btuh/Sqft		Ret/OA	75.0	
Reheat	0.		0.0	0.0	Return	84			o. People	0	Runarnd	75.0	
lumidif	0.	0	0.0	0.0	Exhaust	0			tg % OA	0.0	Fn MtrTD	0.0	
lpt Vent	0.0	0	0.0	0.0	Rm Exh	0			tg Cfm/SqFt		Fn BldTD	0.0	
otal	-3.1	Q			Auxil	0			tg Btuh/SqFt		Fn Frict	0.1	

System 3 Block RAD - RADIATION

Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OAD8: 4 \* \* Space Percnt \* Space Peak Coil Peak Percnt Space Ret. Air Ret. Air Net Percnt \* Sens.+Lat. Sensible Latent Total Of Tot \* (8tuh) (8tuh) (8tuh) (8tuh) (\*Sensible Of Tot \* Space Sens Tot Sens Of Tot Total Of Tot \* Envelope Loads (8tuh) (8tuh) (%) \* (8tuh) (8tuh) (%) 0 0.00 \* 0 0.00 0 0.00 \* 0 0 0.00 0 0.00 \* -10,582 -10,582 8.73 0 Skylite Solr 0 0 0.00 \* 0 0 0.00 \* Skylite Cond 0 0 0 0.00 \* 0 0 0 Roof Cond 0 0.00 \* Glass Solar 0 0.00 0 0.00 \* 0.00 \* 0 0.00 \* 0.05 19.48 0 0.00 \* -23,598 -23,598 19.48 0 0.00 \* -14,016 -14,016 11.57 0 0.00 \* 0 0.00 0 0.00 \* 0 0.00 0 Glass Cond 0 0.00 \* 0 0 0 0.00 \* ₩all Cond Partition 0 0 0.00 \* Exposed Floor 0 0.00 \* -72,967 -72,967 Infiltration 0 0.00 \* 0 0.00 \* 60.22 0 0 0 0.00 \* Sub Total::> 0.00 ∓ -121,163 -121,163 100.00 Internal Loads \* 0 0 0 0.00 \* 0 0.00 \* Lights 0 0 0.00 0 0 0.00 \* People 0.00 \* 0 0.00 0 0 0.00 \* 0 0 0 Misc 0 0 0.00 \* 0 0.00 Sub Total::> 0 0 0 0.00 \* 0 0.00 \* 0 0.00 Ceiling Load 0.00 \* 0 0.00 \* 0 0.00 0 0 0 0.00 \* Outside Air 0 0 0.00 \* 0 0.00 Sup. Fan Heat 0 0.00 \* 0.00 \* 0 0.00 Ret. Fan Heat 0 0 0.00 \* 0.00 \* 0 0.00 Duct Heat Pkup 0 0.00 \* 0 0.00 \* 0 0.00 0 OV/UNDR Sizing 0 0.00 \* 0 0.00 \* 0 0.00 0 0 Exhaust Heat Û 0.00 \* 0.00 \* 0 0.00 0 Terminal Bypass 0 0 0.00 ≉ 0.00 \* 0 0.00 \* Grand Total==> 0 0 0 0 0.00 \* 0.00 \* -121,163 -121,163 100.00 Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (Mbh) (cfm) Deg F Dag F Grains Deg F Deg F Grains Floor 6,194 0, 0.0 0.0 0.0 0.0 0.0 Part 0.0 Main Clg 0.0 0.0 0 Aux Clg 0.0 0.0 0.0 0 0.0 0.0 0.0 0.0 0.0 6.0 ExFlr 0 0. 0.0 0.0 0.0 0.0 0.0 Roof 6,194 Wall 4,555 Opt Vent 0.0 0.0 0.0 0 0 Totals 0.0 0.0 655 14 Capacity Coil Airfl Ent Lvq Type Cooling Heating Clg % OA 0.0 Type Clg Htg (Mbh) (cfm) Deg F Deg F 0 O Clg Cfm/Sqft 0.00 SADB 0.0 68.1 Vent 0 1,048 Clg Cfm/Ton 0.00 Plenum 0 0.0 0.0 Infil Main Htg -121.2 0.0 68.0 0 0.0 0.0 0 0.0 Aux Htg Supply O Clg Sqft/Ton 0.00 Return 0.0 68.0 0 0.0 0.0 Mincfm Preheat 0.0 0 O Clg Btuh/Sqft 0.00 Ret/OA 0.0 68.0 0 0.0 0.0 Return 0. 0.0 0.0 Exhaust 0.0 0 No. People Reheat 0 0 Runarnd 0.0 68.0 0 Htg % DA 0.0 Fn MtrTD 0.0 0.C 0 Htg Cfm/SqFt 0.00 Fn 8ldTD 0.0 0.C 0 Htg Btuh/SqFt -19.56 Fn Frict 0.0 0.C 0.0 0 Humidif Opt Vent 0.0 0.0 Rm Exh 0 Total -121.2 Auxil

BUILDING U-VALUES - ALTERNATIVE 3 COMBINED ECOS

												Room Capac.
Room Number	Description	Part.	ExFlr	Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.	(lb/ sqft)	(Btu/sqft/F)
1	OFFICES	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
1	OFFICES	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
2	CORRIDOR TOILETS	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	39.7	11.18
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	39.7	11.18
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
Zone	<pre>3 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	34.5	10.14
Buildin	g	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	34.0	10.03

BUILDING AREAS - ALTERNATIVE 3 COMBINED ECOS

----- & U I L D I M G A R E A S -----

Room Number	Description	Numbe Dupl: Flr	er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Sk1 /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	<pre>1 Total/Ave.</pre>				4,954	0	0	0	0	4,954	473	14	2,855
System	<pre>1 Total/Ave.</pre>				4,954	0	0	0	0	4,954	473	14	2,855
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	2 Total/Ave.				108	0	0	0	0	108	19	12	134
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	<pre>1 Total/Ave.</pre>				4,954	0	0	0	0	4,954	473	14	2,855
2	CORRIDOR TOILETS	1	1	1,132	1,132	0	0	0	0	1,132	163	15	911
Zone	<pre>2 Total/Ave.</pre>				1,132	0	0	0	0	1,132	163	15	911
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	<pre>3 Total/Ave.</pre>				108	0	0	0	0	108	19	12	134
System	3 Total/Ava.				6,194	0	0	0	0	6,194	655	14	3,900
Buildin	g				11,256	0	0	0	0	11,256	1,148	14	6,89(

ASHRAE 90 ANALYSIS - ALTERNATIVE 3 COMBINED ECOS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.027 (8tu/Hr/Sq Ft/F) Overall Wall U-Value = 0.127 (8tu/Hr/Sq Ft/F) Overall Building U-Value = 0.068 (8tu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.33 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 13.54 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3 COMBINED ECOS

## System Totals

Percent Cooling Load		Heati	ng Load		Cooling	Airflow		Heating	Heating Airflow			
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.4	0	4	-10,704	22	406	280.2	0	0	0.0	0	0
5 - 10	0.8	2	16	-21,407	17	321	560.3	0	0	0.0	0	0
10 - 15	1.2	0	0	-32,111	14	268	840.5	0	0	0.0	0	0
15 - 20	1.6	7	<b>5</b> 9	-42,815	10	189	1,120.7	0	0	0.0	0	0
20 - 25	2.0	3	22	-53,519	5	98	1,400.8	0	0	0.0	0	0
25 - 30	2.4	5	41	-64,222	1	17	1,681.0	0	0	0.0	0	0
30 - 35	2.8	13	105	-74,926	1	17	1,961.2	0	0	0.0	0	0
35 - 40	3.3	5	39	-85,630	1	22	2,241.3	0	0	0.0	0	0
40 - 45	3.7	12	101	-96,333	2	36	2,521.5	0	0	0.0	0	0
45 - 50	4.1	5	43	-107,037	0	7	2,801.7	0	0	0.0	0	0
50 - 55	4.5	6	52	-117,741	0	9	3,081.8	0	0	0.0	0	0
55 - 60	4.9	7	56	-128,444	26	479	3,362.0	0	0	0.0	0	0
60 - 65	5.3	6	49	-139,148	0	0	3,642.2	0	0	0.0	0	0
65 - 70	5.7	6	50	-149,852	0	0	3,922.3	0	0	0.0	0	0
70 - 75	6.1	2	15	-160,556	0	0	4,202.5	0	0	0.0	0	0
75 - 80	6.5	7	60	-171,259	0	0	4,482.7	0	0	0.0	0	0
80 - 85	6.9	0	0	-181,963	0	0	4,762.8	0	0	0.0	0	0
85 - 90	7.3	0	0	-192,667	0	0	5,043.0	0	0	0.0	0	0
90 - 95	7.7	1	5	-203,370	0	0	5,323.2	0	0	0.0	0	0
95 - 100	8.1	14	115	-214,074	0	0	5,603.3	100	1,070	0.0	0	0
Hours Off	0.0	0	7,928	0	0	6,891	0.0	0	7,690	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3 COMBINED ECOS

Temperature						Zone Number
Range (F)	1	3	1	2	3	
Max. Temp.	85.7	86.0	112.5	107.3	104.5	
Mo./Hr.	7 21	7 21	8 21	8 21	8 21	
Day Type	4	4	1	1	1	
						Number of Hours
Above 100	0	0	2,355	1,532	1,129	
95 - 100	0		533	1,098	966	
90 - 95	0		72	298	833	
85 - 90	57		–	128	40	
80 - 85	1,153			490	452	
75 - 80	2,350			262	371	
70 - 75	548					
65 - 70	291			2,023		
60 - 65	1,106			1,141		
55 - 60	303					
50 - 55	1,451					
Below 50	1,501	2,248	0	0	0	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3 COMBINED ECGS

------ MONTHLY ENERGY CONSUMPTION -----

	ELEC Off Peak	DEMAND On Peak	HOT WTR On Peak	HOT W DMND On Peak
Month	(kWh)	(k₩)	(Therm)	(Thrm/hr)
Jan	2,162	11	254	1
Feb	1,956	11	242	1
March	2,367	11	120	1
April	2,058	11	22	1
May	3,055	24	0	0
June	4,055	26	0	0
July	4,412	26	0	0
Aug	4,255	26	0	0
Sept	2,961	25	0	Ù
Oct	2,263	11	13	1
Nov	2,058	11	76	1
Dec	2,059	11	199	1
Total	33,661	26	926	1

Building Energy Consumption = 18,433 (8tu/Sq Ft/rear)
Source Energy Consumption = 41,592 (8tu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 COMBINED ECOS

------ EQUIPMENT ENERGY CONSUMPTION------

JM	Equip - Code	Jan	Feb	Mar	Apr	May	June	umption July	Aug	Sep	Oct	Nov	Dec	Total
۸	LICUTO													
U	LIGHTS ELEC	2160	1955	2366	2057	2263	2263	2057	2366	2057	2263	2057	2057	25 00
	PK	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	2057 11.2	2057 11.2	25,92
	110	11.1	11.2	11,2	11,4	11.2	11.1	11.2	11.2	11.2	11.2	11.2	11.2	11.7
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	(
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	Ō	9	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	MISC LD													
J	OIL	0	0	0	0	0	0	0	0	0	0	0	0	(
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD P STEAM	0	٥	0	۵	۸	۸	Λ	۸	۸	۸	۸	۸	,
	PK	0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.
		0.0	0.0	0.0	٧.٥	٧,٧	٥,٧	0.0	0.0	V.V	0.0	٧.٧	V.V	٧.٠
5	MISC LD													
	P HOTH20	0	0	0	)	G	0	0	0	0	0	0	0	•
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	(
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161		AIR-	CLD COND	COMP <1	s TONS								
•	ELEC	0	0	0	0	228	1049	1567	1102	347	0	0	0	4,29
	PK	0.0	0.0	0.0	0.0	9.5	10.6	10.9	10.6	10.2	0.0	0.0	0.0	10.5
1	רחבטאא		00110	באפנט בא	NO.									
1	EQ5200 ELEC	0	0	ENSER FA O	0	24	92	152	98	34	0	0	0	400
	PK	0.0	0.0	0.0	0.0	0.5	0.9	1.0	0.9	0.7	0.0	0.0	0.0	1.0
	EQ5303	۸	CONT		•	1.0			4.5	7.	•	•		
	ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	19 0.3	66 0.3	60 0.3	69 0.3	36 0.3	0.0	0.0	0.0	250
	rn	0.0	0.0	0.0	٧.٧	0.3	0.5	0.3	0.5	0.5	0.0	0.0	0.0	0.
	EQ1161		AIR-	CLD COND	COMP <1	5 TONS								
	ELEC	0	0	0	0	0	16	38	23	3	0	0	0	7'
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ5200		COND	ENSER FA	NS									
	ELEC	0	0	0	0	0	1	4	2	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ne Air Condit Trane Custom			Network										V 600 Page 38
	IPMENT ENERGY BINED ECOS	CONSUMPT	ION - AL	TERNATIV	E 3									
	ELEC	0	0	0	0	0	46	60	51	10	0	0	0	167
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	0	0	0	0	520	520	472	543	472	0	0	0	2,527
	PΚ	0.0	0.0	0.0	0.0	2.4	2.4	2.4	2.4	2.4	0.0	0.0	0.0	2.4
2	EQ4003		FC C	ENTRIF,	FAN C.V.									
	ELEC	0	0	0	0	2	2	1	2	1	0	0	0	8
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2102		PURC	HASED DI:	ST. HOT I	WATER								
	P HOTH20	254	242	120	22	0	0	0	0	0	13	76	199	<b>92</b> 6
	PK	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0	1.2	1.2	1.2	1.2
1	EQ5020		HEAT	WATER C.	IRC. PUMI	P.C.V.								
	ELEC	1	1	1	0	0	0	0	0	0	0	0	1	5
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 3 COMBINED ECOS

------UTILITY PEAK CHECKSUMS-----

## Utility ELECTRIC DEMAND

Peak Value \$26.5\$ (kW) Yearly Time of Peak \$15\$ (hr) \$7\$ (mo)

Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Utility Demand Equipment Description (kW)	
Cooling (	Equipment		
1 2	EQ1161 EQ1161	AIR-CLD COND COMP <15 TONS 12.2 AIR-CLD COND COMP <15 TONS 0.7	
Sub Tota	1	12.9	48.63
Sub Total	1	0.0	0.00
Air Movi	ng Equipment		
1 2		SUMMATION OF FAN ELECTRICAL DEMAND 2.4 SUMMATION OF FAN ELECTRICAL DEMAND 0.0	
Sub Total	1	2,4	8.94
Sub Total	l	0.0	0.00
Miscellar	neous		
Lights Base Uti Misc Equ Sub Total	uipment	11.2 0.0 0.0 11.2	0.00
Grand Tot	al	26.5	100.00

Building 046
Trace Input File

```
CONTENTS OF : E:\CB46.TM
LINE #
   1
       JOB - 1
   2
       01/ENERGY SAVINGS OPPORTUNITY STUDY
   3
       01/CARLISLE BARRACKS, PA
   4
       01/DEPARTMENT OF THE ARMY
  5
       01/BENATEC ASSOCIATES
  6
       01/BUILDING 46
  7
       08/CARLISLE
  8
       09/MAY/SEP////APR/OCT
  9
       10/CLTD-CLF
 10
       11///ZONE
 11
       LOAD - 1
 12
       19/1/BASE BUILDING
 13
       20/1/1/1ST FL OFFICES/8053/1/2/2//11
       20/2/2/LIQUOR STORE/1127/1/2/2//11
 14
 15
       20/3/3/LIQUOR STORAGE/901/1/2/2//11
 16
       20/4/4/LIBRARY/3692/1/2/2//11
 17
       20/5/5/GAME ROOM/4154/1/2/2//11
 18
      20/6/6/2ND FL OFFICES/1139/1/2/2//11
 19
      20/7/7/2ND FL OFFICE/248/1/2/2//11
       20/8/8/2ND FL TOILETS/582/1/2/2//11
 20
 21
       21/M///CBADCTX///CBADHTX
 22
      22/4/1/YES////186
 23
      22/5/1/YES////186
 24
      22/6/1/YES////186
 25
      22/7/1/YES////186
 26
      22/8/1/YES////186
 27
      24/1/1/105/8.5//170/35
 28
      24/1/2/32/8.5//170/125
 29
      24/1/3/73/8.5//170/215
 30
      24/1/4/90/8.5//170/305
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      24/2/1/17/8.5//170/35
 32
      24/2/2/53/8.5//170/125
 33
      24/2/3/17/8.5//170/215
 34
      24/3/1/16/8.5//170/215
 35
      24/4/1/32/8.5//170/125
 36
      24/4/2/73/8.5//170/215
 37
      24/4/3/49/8.5//170/305
 38
      24/5/1/55/8.5//170/305
 39
      24/5/2/73/8.5//170/35
      24/5/3/31/8.5//170/125
 40
 41
      24/6/1/33/8.5//170/35
 42
      24/6/2/37/8.5//170/125
 43
      24/7/1/16/8.5//170/125
 44
      24/7/2/16/8.5//170/215
 45
      24/8/1/16/8.5//170/215
 46
      24/8/2/17/8.5//170/305
 47
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 48
      25/1/2/6/4/7/.81/.64
 49
      25/1/3/6/4/6/.81/.64
 50
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 57
      25/5/3/6/4/4/.81/.64
 58
      25/6/1/6/4/4/.81/.64
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57

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CONTENTS OF : E:\CB46.TM
LINE #
 59
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 60
       25/7/1/6/4/2/.81/.64
  61
       25/7/2/6/4/2/.81/.64
 62
       25/8/1/6/4/2/.81/.64
 63
       25/8/2/6/4/2/.81/.64
       26/1/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF/OFF
 64
 65
       26/2/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF/OFF
       26/3/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/OFF
 66
       26/4/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF
 67
 68
       26/5/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF
 69
       26/6/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF
 70
       26/7/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/OFF/OFF/OFF
 71
       26/8/OFF/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF
 72
       27/M/280/SF-PERS/285/290/2.4/WATT-SF
 73
       29/1/15/PCT-MCLG/15/PCT-MHTG/.66/CFM-SF/.66/CFM-SF
 74
       29/2////.66/CFM-SF/.66/CFM-SF
       29/3/////.66/CFM-SF
 75
 76
       29/4/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF
 77
       29/5/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF
 78
       29/6////.66/CFM-SF/.66/CFM-SF
 79
       29/7////.66/CFM-SF/.66/CFM-SF
       29/8/////.66/CFM-SF
 80
       30/1
 81
 82
       30/2/1400/CFM/1500/CFM
       30/3///750/CFM
 83
       30/4/4950/CFM
 84
 85
       30/5/3830/CFM
 86
       SYSTEM - 1
 87
       39/1/BASE BUILDING
 88
       40/1/SZ
       41/1/1/2/4/5
 89
 90
       42/1/1.1/1.1
       45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
 91
 92
       40/2/PTAC
 93
       41/2/6/7
 94
       42/2/.2
 95
       45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 96
       40/3/RAD
 97
       41/3/7/8
 98
       42/3
 99
       45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
 100
       40/4/UH
       41/4/3/6
 101
 102
       42/4//.2
       45/4/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
 103
 104
       EQUIPMENT - 1
 105
       59/1/CARLISLE///BASE BUILDING
       60/1/1/PKPLANT/1/1
 106
       60/2/2/PKPLANT/2/2
 107
       62/1/EQ1161/4
 108
 109
       62/2/EQ1161/5
 110
       65/1/1//1/1/3/4
 111
       67/1/EQ2102/1
 112
       69/1/EQ4003
 113
       69/2/EQ4003
       69/3
 114
 115
       69/4//EQ4381
 116
       LOAD - 2
```

```
CONTENTS OF : E:\CB46.TM
LINE #
117
       19/2/WALL & ROOF INSULATION
118
       20/1/1/1ST FL OFFICES/8053/1/2/2//11
119
       20/2/2/LIQUOR STORE/1127/1/2/2//11
120
       20/3/3/LIQUOR STORAGE/901/1/2/2//11
121
       20/4/4/LIBRARY/3692/1/2/2//11
122
       20/5/5/GAME ROOM/4154/1/2/2//11
123
       20/6/6/2ND FL OFFICES/1139/1/2/2//11
124
       20/7/7/2ND FL OFFICE/248/1/2/2//11
125
       20/8/8/2ND FL TOILETS/582/1/2/2//11
126
       21/M///CBADCTX///CBADHTX
127
       22/4/1/YES////185
128
       22/5/1/YES////185
129
       22/6/1/YES////185
130
       22/7/1/YES////185
131
       22/8/1/YES////185
       24/1/1/105/8.5//183/35
132
133
       24/1/2/32/8.5//183/125
134
       24/1/3/73/8.5//183/215
135
       24/1/4/90/8.5//183/305
      24/2/1/17/8.5//183/35
136
137
      24/2/2/53/8.5//183/125
      24/2/3/17/8.5//183/215
138
      24/3/1/16/8.5//183/215
139
      24/4/1/32/8.5//183/125
140
141
      24/4/2/73/8.5//183/215
142
      24/4/3/49/8.5//183/305
143
      24/5/1/55/8.5//183/305
144
      24/5/2/73/8.5//183/35
145
      24/5/3/31/8.5//183/125
146
      24/6/1/33/8.5//183/35
147
      24/6/2/37/8.5//183/125
148
      24/7/1/16/8.5//183/125
149
      24/7/2/16/8.5//183/215
150
      24/8/1/16/8.5//183/215
151
      24/8/2/17/8.5//183/305
152
      25/1/1/6/4/8/.81/.64
153
      25/1/2/6/4/7/.81/.64
154
      25/1/3/6/4/6/.81/.64
155
      25/1/4/6/4/5/.81/.64
156
      25/3/1/6/4/1/.81/.64
157
      25/4/1/6/4/4/.81/.64
158
      25/4/2/6/4/10/.81/.64
159
      25/4/3/6/4/10/.81/.64
160
      25/5/1/6/4/10/.81/.64
161
      25/5/2/6/4/10/.81/.64
162
      25/5/3/6/4/4/.81/.64
163
      25/6/1/6/4/4/.81/.64
164
      25/6/2/6/4/4/.81/.64
165
      25/7/1/6/4/2/.81/.64
166
      25/7/2/6/4/2/.81/.64
      25/8/1/6/4/2/.81/.64
167
168
      25/8/2/6/4/2/.81/.64
      26/1/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF
169
      26/2/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF
170
      26/3/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/OFF/OFF
171
      26/4/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF
172
      26/5/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF
173
      26/6/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF
174
```

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CONTENTS OF : E:\CB46.TM
LINE #
175
       26/7/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/OFF/OFF/OFF
176
       26/8/OFF/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF
177
       27/M/280/SF-PERS/285/290/2.4/WATT-SF
       29/1/15/PCT-MCLG/15/PCT-MHTG/.51/CFM-SF/.51/CFM-SF
178
179
       29/2////.51/CFM-SF/.51/CFM-SF
180
       29/3/////.51/CFM-SF
       29/4/10/PCT-MCLG///.51/CFM-SF/.51/CFM-SF
181
182
       29/5/10/PCT-MCLG///.51/CFM-SF/.51/CFM-SF
183
       29/6////.51/CFM-SF/.51/CFM-SF
184
       29/7////.51/CFM-SF/.51/CFM-SF
185
       29/8/////.51/CFM-SF
186
       30/1
187
       30/2/1400/CFM/1500/CFM
188
       30/3///750/CFM
189
       30/4/4950/CFM
190
       30/5/3830/CFM
191
      SYSTEM - 2
192
      39/2/WALL & ROOF INSULATION
193
       40/1/SZ
194
       41/1/1/2/4/5
195
       42/1/1.1/1.1
196
       45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
197
       40/2/PTAC
198
       41/2/6/7
199
       42/2/.2
200
       45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
201
      40/3/RAD
202
      41/3/7/8
203
      42/3
204
      45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
      40/4/UH
205
206
      41/4/3/6
207
     42/4//.2
      45/4/0FF/0FF/0FF/0FF/CBADHTG/0FF/0FF/0FF
208
209
      EQUIPMENT - 2
      59/2/CARLISLE///WALL & ROOF INSULATION
210
      60/1/1/PKPLANT/1/1
211
212
      60/2/2/PKPLANT/2/2
213
      62/1/EQ1161/4
214
      62/2/EQ1161/5
215
      65/1/1//1/1/3/4
216
      67/1/EQ2102/1
      69/1/EQ4003
217
218
      69/2/E04003
219
      69/3
220
      69/4//EQ4381
221
      LOAD - 3
      19/3/REPLACE FLUORESCENT LAMPS
222
223
      20/1/1/1ST FL OFFICES/8053/1/2/2//11
224
      20/2/2/LIQUOR STORE/1127/1/2/2//11
225
      20/3/3/LIQUOR STORAGE/901/1/2/2//11
      20/4/4/LIBRARY/3692/1/2/2//11
226
227
      20/5/5/GAME ROOM/4154/1/2/2//11
228
      20/6/6/2ND FL OFFICES/1139/1/2/2//11
229
      20/7/7/2ND FL OFFICE/248/1/2/2//11
      20/8/8/2ND FL TOILETS/582/1/2/2//11
230
231
      21/M///CBADCTX///CBADHTX
232
      22/4/1/YES////186
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CONTENTS OF : E:\CB46.TM
LINE
233
       22/5/1/YES////186
234
       22/6/1/YES////186
235
       22/7/1/YES////186
236
       22/8/1/YES////186
237
       24/1/1/105/8.5//170/35
      24/1/2/32/8.5//170/125
238
239
      24/1/3/73/8.5//170/215
240
      24/1/4/90/8.5//170/305
241
      24/2/1/17/8.5//170/35
242
      24/2/2/53/8.5//170/125
243
      24/2/3/17/8.5//170/215
244
      24/3/1/16/8.5//170/215
245
      24/4/1/32/8.5//170/125
246
      24/4/2/73/8.5//170/215
247
      24/4/3/49/8.5//170/305
      24/5/1/55/8.5//170/305
248
249
      24/5/2/73/8.5//170/35
250
      24/5/3/31/8.5//170/125
251
      24/6/1/33/8.5//170/35
252
      24/6/2/37/8.5//170/125
253
      24/7/1/16/8.5//170/125
      24/7/2/16/8.5//170/215
254
255
      24/8/1/16/8.5//170/215
256
      24/8/2/17/8.5//170/305
257
      25/1/1/6/4/8/.81/.64
258
      25/1/2/6/4/7/.81/.64
259
      25/1/3/6/4/6/.81/.64
260
      25/1/4/6/4/5/.81/.64
261
      25/3/1/6/4/1/.81/.64
262
      25/4/1/6/4/4/.81/.64
263
      25/4/2/6/4/10/.81/.64
264
      25/4/3/6/4/10/.81/.64
      25/5/1/6/4/10/.81/.64
265
266
      25/5/2/6/4/10/.81/.64
267
      25/5/3/6/4/4/.81/.64
268
      25/6/1/6/4/4/.81/.64
      25/6/2/6/4/4/.81/.64
269
270
      25/7/1/6/4/2/.81/.64
      25/7/2/6/4/2/.81/.64
271
      25/8/1/6/4/2/.81/.64
272
273
      25/8/2/6/4/2/.81/.64
274
      26/1/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF
275
      26/2/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF
276
      26/3/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/OFF
      26/4/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF
277
      26/5/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF
278
      26/6/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF
279
280
      26/7/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/OFF/OFF/OFF
      26/8/OFF/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF
281
      27/M/280/SF-PERS/285/290/2.1/WATT-SF
282
      29/1/15/PCT-MCLG/15/PCT-MHTG/.66/CFM-SF/.66/CFM-SF
283
      29/2////.66/CFM-SF/.66/CFM-SF
284
285
      29/3/////.66/CFM-SF
      29/4/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF
286
      29/5/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF
287
      29/6////.66/CFM-SF/.66/CFM-SF
288
289
      29/7////.66/CFM-SF/.66/CFM-SF
290
      29/8/////.66/CFM-SF
```

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CONTENTS OF : E:\CB46.TM
LINE #
 291
       30/1
 292
       30/2/1400/CFM/1500/CFM
 293
       30/3///750/CFM
 294
       30/4/4950/CFM
 295
       30/5/3830/CFM
       SYSTEM - 3
 296
 297
       39/3/REPLACE FLUORESCENT LAMPS
 298
       40/1/SZ
 299
       41/1/1/2/4/5
300
       42/1/1.1/1.1
 301
       45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
 302
       40/2/PTAC
303
       41/2/6/7
304
       42/2/.2
       45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
305
306
       40/3/RAD
307
       41/3/7/8
308
       42/3
309
       45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
310
       40/4/UH
311
       41/4/3/6
312
       42/4//.2
313
       45/4/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
314
       EQUIPMENT - 3
315
       59/3/CARLISLE///REPLACE FLUORESCENT LAMPS
316
       60/1/1/PKPLANT/1/1
317
       60/2/2/PKPLANT/2/2
318
       62/1/EQ1161/4
319
       62/2/EQ1161/5
320
       65/1/1//1/1/3/4
321
       67/1/EQ2102/1
322
       69/1/EQ4003
323
      69/2/EQ4003
324
       69/3
325
       69/4//EQ4381
326
       LOAD - 4
327
       19/4/REPLACE FLUORESCENT BALLASTS
       20/1/1/1ST FL OFFICES/8053/1/2/2//11
328
       20/2/2/LIQUOR STORE/1127/1/2/2//11
329
      20/3/3/LIQUOR STORAGE/901/1/2/2//11
330
      20/4/4/LIBRARY/3692/1/2/2//11
331
332
      20/5/5/GAME ROOM/4154/1/2/2//11
      20/6/6/2ND FL OFFICES/1139/1/2/2//11
333
      20/7/7/2ND FL OFFICE/248/1/2/2//11
334
      20/8/8/2ND FL TOILETS/582/1/2/2//11
335
336
      21/M///CBADCTX///CBADHTX
      22/4/1/YES////186
337
      22/5/1/YES////186
338
      22/6/1/YES////186
339
340
      22/7/1/YES////186
341
      22/8/1/YES////186
      24/1/1/105/8.5//170/35
342
      24/1/2/32/8.5//170/125
343
344
      24/1/3/73/8.5//170/215
345
      24/1/4/90/8.5//170/3.05
346
      24/2/1/17/8.5//170/35
347
      24/2/2/53/8.5//170/125
348
      24/2/3/17/8.5//170/215
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CONTENTS OF : E:\CB46.TM
LINE #
349
       24/3/1/16/8.5//170/215
350
       24/4/1/32/8.5//170/125
351
       24/4/2/73/8.5//170/215
352
       24/4/3/49/8.5//170/305
353
       24/5/1/55/8.5//170/305
354
       24/5/2/73/8.5//170/35
355
       24/5/3/31/8.5//170/125
356
       24/6/1/33/8.5//170/35
357
       24/6/2/37/8.5//170/125
358
       24/7/1/16/8.5//170/125
       24/7/2/16/8.5//170/215
359
360
      24/8/1/16/8.5//170/215
361
      24/8/2/17/8.5//170/305
362
      25/1/1/6/4/8/.81/.64
363
      25/1/2/6/4/7/.81/.64
364
      25/1/3/6/4/6/.81/.64
365
      25/1/4/6/4/5/.81/.64
      25/3/1/6/4/1/.81/.64
366
367
      25/4/1/6/4/4/.81/.64
      25/4/2/6/4/10/.81/.64
368
369
      25/4/3/6/4/10/.81/.64
      25/5/1/6/4/10/.81/.64
370
371
      25/5/2/6/4/10/.81/.64
372
      25/5/3/6/4/4/.81/.64
373
      25/6/1/6/4/4/.81/.64
      25/6/2/6/4/4/.81/.64
374
375
      25/7/1/6/4/2/.81/.64
376
      25/7/2/6/4/2/.81/.64
377
      25/8/1/6/4/2/.81/.64
378
      25/8/2/6/4/2/.81/.64
379
      26/1/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF
      26/2/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF
380
      26/3/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/OFF
381
      26/4/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF
382
383
      26/5/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF
384
      26/6/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF
      26/7/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/OFF/OFF/OFF/OFF
385
      26/8/OFF/CBADP&L/OFF/OFF/OFF/OFF/OFF/OFF
386
      27/M/280/SF-PERS/285/290/1.8/WATT-SF
387
      29/1/15/PCT-MCLG/15/PCT-MHTG/.66/CFM-SF/.66/CFM-SF
388
389
      29/2////.66/CFM-SF/.66/CFM-SF
390
      29/3/////.66/CFM-SF
      29/4/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF
391
392
      29/5/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF
      29/6////.66/CFM-SF/.66/CFM-SF
393
394
      29/7////.66/CFM-SF/.66/CFM-SF
395
      29/8/////.66/CFM-SF
396
      30/1
      30/2/1400/CFM/1500/CFM
397
398
      30/3///750/CFM
399
      30/4/4950/CFM
400
      30/5/3830/CFM
401
      SYSTEM - 4
402
      39/4/REPLACE FLUORESCENT BALLASTS
403
      40/1/SZ
404
      41/1/1/2/4/5
405
      42/1/1.1/1.1
406
      45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
```

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CONTENTS OF : E:\CB46.TM
LINE # ----
407
       40/2/PTAC
408
       41/2/6/7
 409
       42/2/.2
 410
       45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
411
       40/3/RAD
412
       41/3/7/8
413
       42/3
414
       45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
415
       40/4/UH
       41/4/3/6
416
417
       42/4//.2
      45/4/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
418
419
       EQUIPMENT - 4
420
      59/4/CARLISLE///REPLACE FLUORESCENT BALLASTS
421
      60/1/1/PKPLANT/1/1
422
      60/2/2/PKPLANT/2/2
423
      62/1/EQ1161/4
424
      62/2/EQ1161/5
425
      65/1/1//1/1/3/4
426
      67/1/EQ2102/1
427
      69/1/EQ4003
428
      69/2/EQ4003
429
      69/3
430
      69/4//EQ4381
```

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CONTENTS OF : E:\CB46B.TM
LINE # -----
   1
       J08 - 1
   2
       01/ENERGY SAVINGS OPPORTUNITY STUDY
   3
       01/CARLISLE BARRACKS, PA
   4
       01/DEPARTMENT OF THE ARMY
   5
       01/BENATEC ASSOCIATES
   6
       01/BUILDING 46
   7
       08/CARLISLE
   8
       09/MAY/SEP////APR/OCT
   9
       10/CLTD-CLF
 10
       11///ZONE
       LOAD - 1
 11
 12
       19/1/REPLACE FLUORESCENT FIXTURES
 13
       20/1/1/1ST FL OFFICES/8053/1/2/2//11
       20/2/2/LIQUOR STORE/1127/1/2/2//11
 14
 15
       20/3/3/LIQUOR STORAGE/901/1/2/2//11
 16
       20/4/4/LIBRARY/3692/1/2/2//11
 17
       20/5/5/GAME ROOM/4154/1/2/2//11
 1.8
       20/6/6/2ND FL OFFICES/1139/1/2/2//11
 19
       20/7/7/2ND FL OFFICE/248/1/2/2//11
      20/8/8/2ND FL TOILETS/582/1/2/2//11
 20
      21/M///CBADCTX///CBADHTX
 21
 22
      22/4/1/YES////186
 23
      22/5/1/YES////186
 24
      22/6/1/YES////186
 25
      22/7/1/YES////186
 26
      22/8/1/YES////186
      24/1/1/105/8.5//170/35
 27
 28
      24/1/2/32/8.5//170/125
 29
      24/1/3/73/8.5//170/215
 30
      24/1/4/90/8.5//170/305
 31
      24/2/1/17/8.5//170/35
 32
      24/2/2/53/8.5//170/125
 33
      24/2/3/17/8.5//170/215
 34
      24/3/1/16/8.5//170/215
 35
      24/4/1/32/8.5//170/125
 36
      24/4/2/73/8.5//170/215
 37
      24/4/3/49/8.5//170/305
 38
      24/5/1/55/8.5//170/305
 39
      24/5/2/73/8.5//170/35
 40
      24/5/3/31/8.5//170/125
 41
      24/6/1/33/8.5//170/35
 42
      24/6/2/37/8.5//170/125
      24/7/1/16/8.5//170/125
 43
 44
      24/7/2/16/8.5//170/215
 45
      24/8/1/16/8.5//170/215
 46
      24/8/2/17/8.5//170/305
 47
      25/1/1/6/4/8/.81/.64
 48
      25/1/2/6/4/7/.81/.64
 49
      25/1/3/6/4/6/.81/.64
      25/1/4/6/4/5/.81/.64
 50
 51
      25/3/1/6/4/1/.81/.64
 52
      25/4/1/6/4/4/.81/.64
 53
      25/4/2/6/4/10/.81/.64
 54
      25/4/3/6/4/10/.81/.64
 55
      25/5/1/6/4/10/.81/.64
 56
      25/5/2/6/4/10/.81/.64
 57
      25/5/3/6/4/4/.81/.64
 58
      25/6/1/6/4/4/.81/.64
```

```
CONTENTS OF : E:\CB46B.TM
LINE #
 59
       25/6/2/6/4/4/.81/.64
 60
       25/7/1/6/4/2/.81/.64
 61
       25/7/2/6/4/2/.81/.64
 62
       25/8/1/6/4/2/.81/.64
 63
      25/8/2/6/4/2/.81/.64
      26/1/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF
 64
      26/2/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF
 65
 66
      26/3/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/OFF/OFF
 67
      26/4/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF
      26/5/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF
 68
      26/6/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF
 69
 70
      26/7/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/OFF/OFF/OFF
 71
      26/8/OFF/CBADP&L/OFF/OFF/OFF/OFF/OFF/OFF
 72
      27/M/280/SF-PERS/285/290/1.5/WATT-SF
 73
      29/1/15/PCT-MCLG/15/PCT-MHTG/.66/CFM-SF/.66/CFM-SF
 74
      29/2////.66/CFM-SF/.66/CFM-SF
 75
      29/3/////.66/CFM-SF
 76
      29/4/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF
 77
      29/5/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF
 78
      29/6////.66/CFM-SF/.66/CFM-SF
 79
      29/7////.66/CFM-SF/.66/CFM-SF
 80
      29/8//////.66/CFM-SF
 81
      30/1
 82
      30/2/1400/CFM/1500/CFM
 83
      30/3///750/CFM
 84
      30/4/4950/CFM
 85
      30/5/3830/CFM
 86
      SYSTEM - 1
 87
      39/1/REPLACE FLUORESCENT FIXTURES
 88
      40/1/SZ
 89
      41/1/1/2/4/5
 90
      42/1/1.1/1.1
 91
      45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
 92
      40/2/PTAC
 93
      41/2/6/7
 94
      42/2/.2
      45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 95
 96
      40/3/RAD
 97
      41/3/7/8
 98
      42/3
      45/3/0FF/0FF/0FF/0FF/0FF/CBADHTG/0FF/0FF/0FF/0FF
 99
100
      40/4/UH
101
      41/4/3/6
      42/4//.2
102
      45/4/0FF/0FF/0FF/0FF/CBADHTG/0FF/0FF/0FF
103
104
      EQUIPMENT - 1
      59/1/CARLISLE///REPLACE FLUORESCENT FIXTURES
105
      60/1/1/PKPLANT/1/1
106
107
      60/2/2/PKPLANT/2/2
108
      62/1/EQ1161/4
109
      62/2/EQ1161/5
110
      65/1/1//1/1/3/4
111
      67/1/EQ2102/1
112
      69/1/EQ4003
113
      69/2/EQ4003
114
      69/3
115
      69/4//EQ4381
116
      LOAD - 2
```

```
CONTENTS OF : E:\CB46B.TM
LINE # -----
 117
       19/2/COMBINED ECOS
118
       20/1/1/1ST FL OFFICES/8053/1/2/2//11
 119
       20/2/2/LIQUOR STORE/1127/1/2/2//11
 120
       20/3/3/LIQUOR STORAGE/901/1/2/2//11
 121
       20/4/4/LIBRARY/3692/1/2/2//11
 122
       20/5/5/GAME ROOM/4154/1/2/2//11
123
       20/6/6/2ND FL OFFICES/1139/1/2/2//11
124
       20/7/7/2ND FL OFFICE/248/1/2/2//11
125
       20/8/8/2ND FL TOILETS/582/1/2/2//11
126
       21/M///CBADCTX///CBADHTX
127
       22/4/1/YES////185
128
       22/5/1/YES////185
129
       22/6/1/YES////185
130
       22/7/1/YES////185
       22/8/1/YES////185
131
132
       24/1/1/105/8.5//183/35
133
       24/1/2/32/8.5//183/125
134
       24/1/3/73/8.5//183/215
135
       24/1/4/90/8.5//183/305
136
       24/2/1/17/8.5//183/35
137
       24/2/2/53/8.5//183/125
       24/2/3/17/8.5//183/215
138
139
       24/3/1/16/8.5//183/215
140
       24/4/1/32/8.5//183/125
141
       24/4/2/73/8.5//183/215
142
       24/4/3/49/8.5//183/305
143
       24/5/1/55/8.5//183/305
144
       24/5/2/73/8.5//183/35
145
       24/5/3/31/8.5//183/125
146
       24/6/1/33/8.5//183/35
147
       24/6/2/37/8.5//183/125
148
       24/7/1/16/8.5//183/125
149
      24/7/2/16/8.5//183/215
150
       24/8/1/16/8.5//183/215
151
      24/8/2/17/8.5//183/305
152
      25/1/1/6/4/8/.81/.64
153
       25/1/2/6/4/7/.81/.64
154
       25/1/3/6/4/6/.81/.64
155
      25/1/4/6/4/5/.81/.64
156
      25/3/1/6/4/1/.81/.64
157
      25/4/1/6/4/4/.81/.64
158
      25/4/2/6/4/10/.81/.64
159
      25/4/3/6/4/10/.81/.64
160
      25/5/1/6/4/10/.81/.64
161
      25/5/2/6/4/10/.81/.64
162
      25/5/3/6/4/4/.81/.64
163
      25/6/1/6/4/4/.81/.64
164
      25/6/2/6/4/4/.81/.64
165
      25/7/1/6/4/2/.81/.64
166
      25/7/2/6/4/2/.81/.64
167
      25/8/1/6/4/2/.81/.64
168
      25/8/2/6/4/2/.81/.64
169
      26/1/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF
170
      26/2/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF
      26/3/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/OFF
171
172
      26/4/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF
      26/5/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF
173
```

26/6/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF

174

```
CONTENTS OF : E:\CB46B.TM
LINE #
175
       26/7/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/OFF/OFF/OFF/OFF
176
       26/8/OFF/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF
177
       27/M/280/SF-PERS/285/290/1.5/WATT-SF
178
       29/1/15/PCT-MCLG/15/PCT-MHTG/.51/CFM-SF/.51/CFM-SF
1.79
       29/2////.51/CFM-SF/.51/CFM-SF
180
       29/3/////.51/CFM-SF
181
       29/4/10/PCT-MCLG///.51/CFM-SF/.51/CFM-SF
182
       29/5/10/PCT-MCLG///.51/CFM-SF/.51/CFM-SF
183
       29/6////.51/CFM-SF/.51/CFM-SF
184
       29/7////.51/CFM-SF/.51/CFM-SF
185
      29/8/////.51/CFM-SF
186
      30/1
      30/2/1400/CFM/1500/CFM
187
188
      30/3///750/CFM
189
      30/4/4950/CFM
190
      30/5/3830/CFM
191
      SYSTEM - 2
192
      39/2/COMBINED ECOS
193
      40/1/SZ
194
      41/1/1/2/4/5
195
      42/1/1.1/1.1
196
      45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
197
       40/2/PTAC
198
      41/2/6/7
199
       42/2/.2
200
       45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
201
       40/3/RAD
202
      41/3/7/8
203
      42/3
      45/3/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
204
205
      40/4/UH
206
      41/4/3/6
207
      42/4//.2
208
      45/4/0FF/0FF/0FF/0FF/CBADHTG/0FF/0FF/0FF
209
      EQUIPMENT - 2
      59/2/CARLISLE///COMBINED ECOS
210
211
      60/1/1/PKPLANT/1/1
212
      60/2/2/PKPLANT/2/2
213
      62/1/EQ1161/4
214
      62/2/EQ1161/5
      65/1/1//1/1/3/4
215
216
      67/1/EQ2102/1
217
      69/1/E04003
218
      69/2/EQ4003
219
      69/3
```

69/4//EQ4381

220

Building 046

Trace Output File

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 46

Weather File Code: CARLISLE

Location: ENERGY SAVINGS OPPORTUNITY STUDY

 Latitude:
 40.2 (deg)

 Longitude:
 77.2 (deg)

 Time Zone:
 5

 Elevation:
 475 (ft)

Barometric Pressure: 475 (ft)
29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Ory Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Data Organam was Dun: 13-34-17 1/13/04

Time/Date Program was Run: 13:34:17 1/13/94
Dataset Name: CB46 .TM

Trane Air Conditioning Economics
By: Trane Customer Direct Service Network

AIRFLOW - ALTERNATIVE 1 BASE BUILDING

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	1,847	16,641	16,741	20,668	5,774	0	0
2	PTAC	0	1,735	1,735	2,307	572	0	0
3	RAD	0	0	0	0	365	0	0
4	UH	0	0	6,035	0	2,238	0	0
Totals		1,847	18,376	24,511	22,975	8,949	0	0

CAPACITY - ALTERNATIVE 1
BASE BUILDING

Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Capacity Totals
Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) i sz 0.0 50.2 -665,874 0 -59,698 50.2 0.0 0 0 0 -665,874 6.3 -85,408 0 0 0 0 0 0 0 0 2 PTAC 0 0 6.3 0.0 0.0 0 -85,408 0.0 0.0 - 49,3120.0 0 0 3 RAD 0.0 0 -49,312 0 0 0.0 -349,136 0.0 0 -349,136 4 UH 0.0 0.0 0 -59,698 0 -1,149,729 Totals 56.5 0.0 0.0 56.5 -1,149,729

The building peaked at hour 16 month 7 with a capacity of 56.1 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

------- ENGINEERING CHECKS ------- ENGINEERING

			Percent		Cool:	ing		Heat			
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft	
1	Main	SI	11.10	0.98	331.3	339.0	35.40	0.98	-39.11	17,026	
2	Main	PTAC	0.00	1.25	277.2	221.6	54.15	1.25	-61.58	1,387	
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-59.41	830	
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.61	-35.32	9,886	

Trane Air Conditioning Economics By: Trane Customer Direct Service Network

System 1 Peak SZ - SINGLE ZONE

				_ PEAK ****										******
Peaked a Outside			Mo/Hr: DB/WB/HR:	7/14 91/ 74/105.	0		*			7/16 * 91 *		Mo/Hr: 1 OADB:		
		Space	Ret. Air	r Ret. Air	Ne	et Percn	* t *	St	nace	* Percnt *	Space P	eak Coil	Peak	Percnt
		Sens.+Lat.			Tota			Sensi		Of Tot *	•			Of Tot
Envelope				) (Btuh)	(Btul	1) (%		(B1			•	uh) (1		(%)
Skylit		Ó	` (	) ` ´ ´			ý *	,	Ö	0.00 *	(	0	0	0.00
Skylit	e Cond	0	(	)		0.00			0	0.00 *		0	0	0.00
Roof C	ond	ſ)	124 323	ζ	124,32				0	0.00 *		0 -90		16.49
Glass	Solar	70,848 19,448	. (	)	70,84	18 11.7		73,	.968			0	0	0.00
Glass	Cond	19,448	(	)	19,44	18 3.23					-95.	233 -95	5.233	17.40
Wall C	ond	18,393	3,709	)	22,10	2 3.6		19.	,852 ,556	5.74 *		914 -88		
Partit		0	•		,	0 0.00	) *	,	0	0.00 *				0.00
	d Floor					0 0.00	) *		0	0.00 *		0	0	0.00
Infilt		152,805			152,80					19.44 *		498 -273		
	tal==>		128,032		389,52					52.72 *		645 -547	•	
Internal		,	,				*	,	, • • ·	*		51.	,010	100100
		113,020	(	)	113,02	20 18.75	5 *	116.	. 503	34.20 *		0	0	0.00
		32,428			32,42			15,		4.50 *		0	0	0.00
Misc		0	(	) 0	V=, /-			10,	0	0.00 *		0	Ô	0.00
	tal:=>	145,449	C	) 0	145,44					38.70 *		Ö	0	0.00
Ceiling	Load	42,074	-42.074	•	- 10,			31,		9.36 *		366	0	0.00
Outside		0	,	) 0	73,70			,	0	0.00 *		0	0	0.00
Sup. Fan					13,01				•	0.00 *		•	0	0.00
Ret. Fan			0	)	,		) *			0.00 *		•	0	0.00
Duct Hea						0 0.00				0.00 *			0	0.00
		-2,662		)	-2,66			-2,	662			0	0	-0.00
Exhaust	Heat		-16.318	3 0	-16.31	8 -2.71		-,	,	0.00 *		•	0	0.00
Terminal			C	0		0 0.00				0.00 *			0	0.00
Grand To	tal==>	446,355	69,640	) 0	602,71	4 100.00	*	340,	,673	* 100.00 *		011 -547	,345	100.00
			cnr	OLING COIL S	FI FCTION							AREAS-		
	Total	Capacity	Sens Cap.	Coil Airfl	Fnter	ing DR/WE	R/HR	l eav	ing DB	/WR/HR	Grass In			
				(cfm)							Floor		.55 (5)	, (0)
Main Clo				16,641								0		
Aux Clg	0.0		0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	Ö		
Opt Vent	0.0		0.0	0	0.0		0.0	0.0	0.0	0.0	Roof	7,846		0 0
Totals	50.2			·	0.10	V. V		0.0	•••	***	Wall	5,950	1,7	776 30
	HEATI	NG COIL SELE	ECTION		A	IRFLOWS (	(cfm)-		E	NGINEERING	CHECKS	TEMPER	RATURES	S (F)
	Capaci	ty Coil Ai	irfl Ent	Lvg	Type	Cooling		eating		% 0A	11.1	Type	Clg	
	(Mbh	•		_	Vent	1,847	-	0	_	Cfm/Sqft	0.98	SADB	56.2	
Main Htg	-665			-		3,927		3,927		Cfm/Ton	331.31	Plenum	82.8	
Aux Htg	0	•	0 0.0		Supply	16,641		16,741		Sqft/Ton	338.99	Return	82.9	
Preheat	-59				Mincfm	(		0	_	Btuh/Sqft		Ret/OA	83.7	
Reheat		.0	0.0		Return	16,641		16,741	_	People	61	Runarnd	75.0	
		.0	0 0.0											
Humidif	v	. v	v v.u	v. v. v	CXIIAUSL	1.04	1	0	MLO	ี ซ บห	V. U	F 11 1711. T 11	, ,,,	
Humidit Opt Vent		.0	0 0.0		Exhaust Rm Exh	1,847		0		∣% OA ∣Cfm/SqFt	0.0 0.98	Fn MtrT( Fn BldT(		

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

******	*******	******	COOLING COIL	PEAK ****	*******					***** HEATI		
	t Time ==		Mo/Hr:					/Hr:			1o/Hr: 13/ 1	
Outside	Air ==>	04	DB/WB/HR: 9	91/ 74/105.	0		* 0	ADB:	91 *		OAD8: 4	
		Space	Ret Sir	Ret. Air	Not	Percnt	* c	pace	* Percnt *	Conno Dank	Coil Dool	0
	S	ens.+Lat.	Sensible	Latent	Total	Of Tot			Of Tot *		Coil Peak Tot Sens	
Envelope		(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		tuh)	(%) *	•	(Btuh)	
Skylit		0	0	(50411)	(50011)	0.00		0	0.00 *	• •	(01411)	. `. ′
Skylit		0	0		0	0.00		0	0.00 *		(	
Roof C		0	21,360		21,360	28.44		0	0.00 *		-17,749	
Glass		11,232	0		11,232	14.95		,944	26.48 *		17,747	
Glass		3,009	0		3,009	4.01		,180	7.70 *			
Wall C		2,731	564		3,295	4.39		,977	7.21 *	,	•	
Partit		0	304		0,273	0.00		0	0.00 *	•	-12,231	
	d Floor	0			0	0.00		0			0	
Infilt		24,717				32.91		•	0.00 *		70.053	
Sub To		41,690	21,923	•	24,717			,865	23.87 *	•	-39,853	
Internal		41,070	21,723		63,613	84.70	• ∠0 k	,967	65.26 <b>*</b>	•	-85,276	100.00
Lights		8,687	۸		0 (07			01.4				
People		2,558	0		8,687	11.57		,914	21.57 *		0	
Misc		2,330	0	۸	2,558	3.41		,167	2.82 *		0	
Sub To	tol\	11,246	0	0	11.24	0.00		0	0.00 *		0	
Ceiling		3,880	-3,880	V	11,246	14.97		,081	24.40 *		0	*
Outside :		3,000	-3,000	0	0	0.00		,275	10.35 *	,	0	
Sup. Fan		V	V	V	0	0.00		0	0.00 *		0	
Ret. Fan			0		247	0.33			0.00 *		. 0	
Duct Hea			0		0	0.00			0.00 *		0	
OV/UNDR		0	U		0	0.00		0	0.00 *		0	
Exhaust	-	V	0	0	0	0.00		V	0.00 *		0	
Terminal			0	0	0	0.00			0.00 *		0	
i Oi militul	by pass		V	V	. •	0.00	` '		0.00 *		0	0.00
Grand To	tal==>	56,816	18,043	. 0	75,106	100.00	41	, 323	100.00 *		-85,276	100.00
			C001	ING COIL SE	:  FCTTON						-AREAS	
1	Total	Capacity	Sens Cap.			g D8/WB/HF	l lea	√ina D	B/WB/HR	Gross Total		sf) (%)
	(Tons)	(Mbh)	(Mbh)		Deg F Deg			-	Grains		387	31) (16)
Main Clg	6.3	75.1		1,735			-	_		Part	0	
Aux Clg	0.0	0.0	0.0	0		.0 0.0		0.0		ExFlr	0	
Opt Vent	0.0	0.0	0.0	0		.0 0.0		0.0			387	0 0
Totals	6.3	75.1		·			,,,	•••			867	288 33
			ECTION		AIR	FLOWS (cfm	)		ENGINEERING	CHECKS	-TEMPERATUR	ES (F)
	Capacity			Lvg	Type	Cooling	Heating	Cl	g % OA	0.0	Type Cl	
	(Mbh)	•		_	Vent	0	0	Cl	g Cfm/Sqft	1.25 S		.1 104.3
Main Htg	-85.4		735 59.0		Infil	572	572	Cl	g Cfm/Ton	277.24 P	lenum 83	
Aux Htg	0.0		0.0	0.0	Supply	1,735	1,735	Cle	g Sqft/Ton	221.61 R	eturn 83	
Preheat	-0.0			53.0	Mincfm	0	0	Cle	g Btuh/Sqft		et/OA 83	
Reheat	0.0		0.0	0.0	Return	1,735	1,735	No.	. People		unarnd 75	
Humidif	0.0		0.0		Exhaust	0	0	Ht	g % OA	0.0 F	n MtrTD 0	.0 0.0
Opt Vent	0.0		0.0		Rm Exh	0	0	Htg	g Cfm/SqFt	1.25 F	n BldTD 0	.0 0.0
Total	-85.4	1			Auxil	0	0	Ht	g Btuh/SqFt	-61.58 F	n Frict 0	.1 0.0

System 3 Block RAD - RADIATION

	: Time ==:		Mo/Hr: (	•	•		*			0/0 *		Mo/Hr: 13,		
utside A	11r ==>	OAL	B/WB/HR:	0/ 0/ 0.	0		*	0	AD8:	0 *		OADB:	,	
		Space	Ret. Air	Ret. Air	N	et Perd	ent *	S	pace	Percnt *	Space Peal	k Coil Pe	ak	Percr
	Se	ens.+Lat.	Sensible	Latent	Tot	al Of 1	Tot *	Sens	ible	Of Tot *	Space Sens	s Tot Se	ins	Of To
nvelope	Loads	(Btuh)	(Btuh)	(Btuh)	(8tu	h) (	(%) *	(8	tuh)	(%) *	(Btuh	) (Bti	ıh)	(1
Skylite	Solr	0	0			0 0.	* 00.		0	0.00 *	(	)	0	0.0
Skylite	Cond	0	0			0 0	.00 *		0	0.00 *	(	)	0	0.0
Roof Co	nd	0	0			0 0.	* 00.		0	0.00 *	(	-6,7	14	13.6
Glass S	Solar	0	0			0 0.	* 00.		0	0.00 *	(	)	0	0.
Glass C	Cond	0	0			0 0.	* 00		0	0.00 *	-10,29	-10,2	95	20.
Wall Co	ond	0	0			0 0.	.00 *		0	0.00 *	-5,71	l -6,9	707	14.
Partiti	on	0				0 0.	* 00.		0	0.00 *	(	)	0	0.
Exposed	l Floor	0				0 0	.00 *		0	0.00 *	(	)	0	0.
Infiltr	ation	0				0 0.	* 00.		0	0.00 *	-25,39	5 -25,3	96	51.
Sub Tot	(al:=>	0	0			0 0	* 00.		0	0.00 *	-41,40	3 -49,3	12	100.
nternal	Loads						*			*				
Lights		0	0			0 0	.00 *		0	0.00 *	(	)	0	0.
People		0				0 0.	.00 <b>*</b>		0	0.00 *	(	)	0	0.
Misc		0	0	0		0 0	.00 *		0	0.00 *	(	)	0	0.
Sub:Tot	al::>	0	0	0		0 0.	* 00		0	0.00 *	(	)	0	0.
eiling L	.oad	0	0			0 0	.00 *		0	0.00 *	-7,80	5	0	0
utside A	hir	0	0	0		0 0.	.00 *		0	0.00 *		)	0	0
up. Fan	Heat					0 0.	* 00.			0.00 *		,	0	0
et. Fan			0				.00 *			0.00 *			0	0
uct Heat	Pkup		0			0 0	.00 *			0.00 *			0	0
V/UNDR S	Sizing	0				0 0.	.00 *		0	0.00 *	(	)	0	0
xhaust H	leat		0	0		0 0	.00 *			0.00 *			0	0
erminal	Bypass		0	0		0 0.	* 00			0.00 *			0	0.
I	• •						*			*				
rand <sup> </sup> Tot	;al==>	0	0	. 0		0 0.	.00 *		0	0.00 *	-49,20	3 -49,3	112	100
				LING COIL S								AREAS		
i			Sens Cap.			ring D8/			-	B/WB/HR	Gross Tota		(sf	) (
	(Tons)	(Mbh)	(Mbh)		. Deg F	-		Deg F	-	Grains	Floor	830		
in Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		Part	0		
< Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		ExFlr	0		_
t Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	830		0
tals	0.0	0.0									Wall	553	1'	92
			CTION							ENGINEERING		TEMPERA		
	Capacity			Lvg		Cool		Heating		g % OA		Type	Clg	
	(Mbh)	(cfi		Deg F	Vent		0	0		g Cfm/Sqft	0.00	SADB	0.0	
in Htg	-49.3		0.0	0.0	Infil		0	365		g Cfm/Ton		Plenum	0.0	
k Htg	0.0		0.0	0.0	Supply		0	0		g Sqft/Ton	0.00	Return	0.0	
eheat	0.0	)	0.0	0.0	Mincfm		0	0	Cl	g Btuh/Sqft	0.00	Ret/OA	0.0	3
neat	0.0	)	0.0	0.0	Return		0	0	No	. People	0	Runarnd	0.0	6
midif	0.0	)	0.0	0.0	Exhaust		0	0	Ht	g % OA	0.0	Fn MtrTD	0.0	
t Vent	0.0	)	0.0	0.0	Rm Exh		0	0		g Cfm/SqFt		Fn BldTD	0.0	(
tal	-49.3				Auxil		0	0		g Btuh/SqFt		Fn Frict	Ú.0	

System 4 Block UH - UNIT HEATERS

				******	******							******
			•	٨								
11:/	Un	00/ #0/ IIK.	v, v, v.	V		*	נסטאנ	*		URUB:	4	
	Space	Ret. Air	Ret. Air	Net	Percnt	* S	pace	Percnt *	Space Pe	ak Cnil	Peak	Percnt
Se	•	Sensible	Latent	Total								Of Tot
Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)								(%)
e Solr	0	0		0			Ó		,	Ó	Ó	0.00
e Cond	0	0		0	0.00	*	0			0	0	0.00
and	0	0		0	0.00	*	0	0.00 *		0 -74	,057	21.67
Solar	0	0		0	0.00	*	0	0.00 *		0	0	0.00
Cond	0	0		0	0.00	*	0	0.00 *	-73,3	55 -73	355	21.47
ond	0	0		0	0.00	*	0	0.00 *	-30,8	99 -38	,407	11.24
ion	0			0	0.00	*	0	0.00 *		0	0	0.00
floor	0			0	0.00	*	0	0.00 *		0	0	0.00
ration	0			0	0.00	*	0	0.00 *	-155,8	94 -155	,894	45.62
tal:=>	0	0		0	0.00	*	0	0.00 *	-260,1	48 -341	,713	100.00
Loads						*		*				
	0	0		0	0.00	*	0	0.00 *		0	0	0.00
	0			0	0.00	*	0	0.00 *		0	0	0.00
	0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
cal::>	0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
.oad	0	0		0	0.00	*	0	0.00 *	-84,8	80	0	0.00
ir 💮	0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
Heat				0	0.00	*		0.00 *			0	0.00
Heat		0		0	0.00	*		0.00 *			0	0.00
: Pkup		0		0	0.00	*		0.00 *			0	0.00
Sizing	0			0	0.00	*	0	0.00 *		0	0	0.00
leat		0	0	0	0.00	*		0.00 *			0	0.00
Bypass		0	0	0	0.00	*		0.00 *			0	0.00
				*		*		*				
.al==>	0	0	0	0	0.00	*	0	0.00 *	-345,0	28 -341,	713	100.00
		C001	ING COIL S	ELECTION						AREAS		
Total Ca	apacity	Sens Cap.	Coil Airfl	Enterio	ig DB/WB/	HR Lea	ving D	B/WB/HR	Gross Tota	al Glas	s (sf	(%)
(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg	, F Grai	ns Deg F	Deg F	Grains	Floor	9,886		
0.0	0.0	0.0	0	0.0	.0 0	.0 0.0	0.0	0.0	Part	0		
0.0	0.0	0.0	0	0.0	0.0	.0 0.0	0.0	0.0	Exflr	0		
	0.0	0.0	0	0.0	.0 0	.0 0.0	0.0	0.0	Roof	8,985		0 0
0.0	0.0								Wall	3,392	1,3	368 40
HEATING	COIL SELE	ECTION		AIR	IFLOWS (c	fm)	{	ENGINEERING	CHECKS	TEMPERA	TURES	(F)
					•	Heating			0.0			Htg
(Mbh)			Deg F		Ö	=		_	0.00	SADB		120.5
-349.1	6,0	35 67.4	120.5		0	2,238				Plenum	0.0	
0.0		0.0	0.0		0			-	0.00	Return	0.0	
0.0		0.0	0.0	Mincfm	0							
							-					
0.0		0.0	0.0	Return	0	6,035	No.	. People	0	Runarnd	0.0	1 68.0
0.0		0 0.0	0.0 0.0	Keturn Exhaust	0	6,035 0		. People 3 % DA		Runarnd Fn MtrID	0.0	
							Htq		0 0.0 0.61	Runarnd Fn MtrTD Fn BldTD	0.0 0.0 0.0	0.0
the eeo occident	Time ==> Air ==> Air ==> Air ==> Se Loads Solr Cond And Colar Cond And Colar Cond And And And And And And And And And A	Space   Sens. + Lat.	Stime ==>   Mo/Hr:   Nir ==>   OADB/WB/HR:     Space	Space   Ret. Air   Ret. Air   Sens. + Lat.   Sensible   Latent   Loads   (Btuh)   Time ==>	Stime ==>   Mo/Hr: 0/0   Ohir ==>   OADB/WB/HR: 0/0   Oho	Time ==>	Time ==>	Time ==>   Mo/Hr:   O/ O	Time ==>	Time ==>   Mo/Mr: 0/ 0	Space   Ret. Air   Ret. Air   Net   Percht   #   Space   Percht   #   Space	
BUILDING U-VALUES - ALTERNATIVE 1 BASE BUILDING

------ BUILDING U-VALUES------

	Room U-Values										Room	Room
					(Btu	/hr/sqf	t/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
2	LIQUOR STORE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	49.2	10.88
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone .	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	75.9	17.16
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
8	2ND FL TOILETS	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	78.1	17.65
3	LIQUOR STORAGE	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
Zone ;	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone :	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	47.0	10.75
Buildin	g	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	50.5	11.33

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

------ B U I L D I N G A R E A S ------

				Floor	Total		Exposed						
				Area/Dupl		Partition	Floor	Skylight		Net Roof	Window		Net Wall
Room			icate	Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	1ST FL OFFICES	1	1	8,053	8,053	0	0	0	0	0	624	24	1,926
Zone	1 Total/Ave.	-	-	3,100	8,053	0	0	0	0	Ŏ	624	24	1,926
	LIQUOR STORE	1	1	1,127	1,127	Ö	0	0	0	0	0	0	739
Zone	2 Total/Ave.	-	-	-,	1,127	0	0	0	0	0	0	0	739
	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.	_	_	-,	3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.			,	4,154	0	0	0	0	4,154	576	43	775
System	<pre>1 Total/Ave.</pre>				17,026	0	0	0	0	7,846	1,776	30	4,174
. 6	2ND FL OFFICES	1	i	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.			,	1,139	0	0	0	0	1,139	192	32	403
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
System	2 Total/Ave.				1,387	0	0	0	0	1,387	288	33	579
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	. 96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
8	2ND FL TOILETS	1	1	582	582	0	0	0	0	582	96	34	184
Zone	8 Total/Ave.				582	0	0	0	0	582	96	34	184
Systemi	3 Total/Ave.				830	0	0	0	0	830	192	35	360
3	LIQUOR STORAGE	1	1	901	901	0	0	0	0	0	24	18	112
Zone	3 Total/Ave.				901	0	0	0	0	0	24	18	112
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone 🕴	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
System	4 Total/Ave.				9,886	0	0	0	0	8,985	1,368	40	2,023
Buildin	g				29,129	. 0	0	0	0	19,048	3,624	34	7,137

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ASHRAE 90 ANALYSIS - ALTERNATIVE 1 BASE BUILDING

----- ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.232 (Btu/Hr/Sq Ft/F) Overall Wall U-Value = 0.500 (Btu/Hr/Sq Ft/F) Overall Building U-Value = 0.329 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 18.58 (8tu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVW) = 33.33 (8tu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

## System Totals

Percent	Cool	ing Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	2.8	1	8	-60,471	26	594	1,225.6	0	0	0.0	0	0
5 - 10	5.6	3	27	-120,943	30	680	2,451.1	0	0	0.0	0	0
10 - 15	8.5	10	83	-181,414	17	376	3,676.7	0	0	0.0	0	0
15 - 20	11.3	8	63	-241,885	2	56	4,902.2	0	0	0.0	0	0
20 - 25	14.1	1	8	~302,357	1	23	6,127.8	59	3,638	0.0	0	0
25 - 30	16.9	16	128	-362,828	2	52	7,353.3	0	0	0.0	0	0
30 - 35	19.8	2	18	-423,300	0	6	8,578.9	0	0	0.0	0	0
35 - 40	22.6	7	54	-483,771	2	42	9,804.5	0	0	0.0	0	0
40 - 45	25.4	7	60	-544,242	2	43	11,030.0	0	0	0.0	0	0
45 - 50	28.2	6	46	-604,714	0	3	12,255.6	0	0	0.0	0	0
50 - '55	31.1	8	63	-665,185	1	28	13,481.1	0	0	0.0	0	0
55 - 60	33.9	8	67	-725,656	16	363	14,706.7	24	1,450	0.0	0	0
60 - 65	36.7	3	23	-786,128	0	0	15,932.2	0	0	0.0	0	0
65 - 70	39.5	5	39	-846,599	0	0	17,157.8	0	0	0.0	. 0	0
70 - 75	42.4	10	83	-907,071	0	0	18,383.4	10	634	0.0	0	0
75 - 80	45.2	2	15	-967,542	0	0	19,608.9	7	436	0.0	0	0
80 - 85	48.0	1	5	-1,028,013	0	0	20,834.5	0	0	0.0	0	0
85 - 190	50.8	2	20	-1,088,485	0	0	22,060.0	0	0	0.0	0	0
90 - 95	53.7	0	0	-1,148,956	0	0	23,285.6	0	0	0.0	0	0
95 - 100	56.5	0	0	-1,209,427	. 0	0	24,511.1	0	0	0.0	0	0
Hours Off	0.0	0	7,950	0	0	6,494	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1 BASE BUILDING

						8 U I	LDI	N G	TEM	PER	ATU	R E P	R O F	ILES
Temp	erature										Zone N	umber		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
	Range (F)	1	2	4	5	6	7	7					6	
Max	. Temp.	83.5	81.1	89.9	89.0	87.3	87.5	104.5	104.9	132.3	110.0	109.1	105.1	
1	Mo./Hr.	7 19	7 21	7 20	7 20	7 20	7 20	8 20	7 19	8 18	7 19	7 19	7 19	
D	ay Type	4	4	4	4	4	4	1	2	2	2	2	2	
										Nu	mhar a	f Wour	e	
Αb	ove 100	0	0	0	0			620				1,147		***************************************
	5 - 100	Ö	•	•	•	-	•	1,376						
	0 - 95	0				-			874					
	5 - 90	Õ	_	-	-	,		-	475					
	0, - 85	903			1,312									
	5 - 80		2,561			-	•		0			56		
	0 - 75	910								1,277		488		
	5 70		2,211					1,883						
	0 - 65		1,240					1,017				•	1,067	
5!	5 - 60	595	•									822	,	
	0 - 55	391				778			1,010			1.143		
86	elow 50	614	523	1,870	2,418	2,447	2,107		,			0	,	
Min	. Temp.	37.1	39.1	34.6	32.3	33.3	36.2	54.9	54.9	54.9	54.9	54.9	54.9	
	Mo./Kr.	2 7		2 10		2 8	2 10	1 6	1 6	1 2	1 6	1 5	1 5	
Da	ay Type	5	5	4	4	5	4	2	2	4	2	2		

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING

------ MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (k₩h)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	14,233	74	1,247	7
Feb	12,878	74	1,190	7
March	15,582	74	644	7
April	13,545	74	122	7
May	17,602	155	0	0
June	22,034	160	0	0
July	24,623	164	0	0
Aug	23,101	160	. 0	0
Sept	16,020	156	0	0
Oct ,	14,898	74	96	7
Nov	13,548	74	433	7
Dec	13,555	74	1,000	7
Total	201,620	164	4,731	7

Building Energy Consumption = 39,866 (Btu/Sq Ft/Year)
Source Energy Consumption = 92,535 (Btu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1

BASE BUILDING

Ref	Equip					Mon	thly Cons	sumption						
Num	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	0ct	Nov	Dec	Total
0	LIGHTS													
	ELEC	13433	12154	14712	12793	14073	14073	12793	14712	12793	14073	12793	12793	161,198
	PK	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	ÞΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	ΡK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH20	0	0	0	0	. 0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161		AIR-	CLD CON	COMP <									
	ELEC	0	0	0	0	1441	4989	8244	5249	1320	0	0	0	21,243
	ÞΚ	0.0	0.0	0.0	0.0	64.7	67.3	69.6	67.5	65.0	0.0	0.0	0.0	69.6
1	EQ5200		COND	ENSER FA	2NA									
	ELEC	0	0	0	0		. 457	799	488	139	0	0	0	2,032
	PK	0.0	0.0	0.0	0.0	3.9	5.3	6.2	5.2	3.9	0.0	0.0	0.0	6.2
1	EQ5303			ROLS										
	ELEC	0	0	0	0	24	66	60	69	22	0	0	0	241
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161			CLD CON										
	ELEC	0	0	0	0	119	572	975	618	113	0	0	0	2,398
	PK	0.0	0.0	0.0	0.0	8.0	8.4	8.7	8.4	8.1	0.0	0.0	0.0	8.7
2	EQ5200			ENSER FA										
	ELEC	0	0	0	0	13	53	95	58	12	0	0	0	231
	PK	0.0	0.0	0.0	0.0	0.4	0.7	0.8	0.6	0.5	0.0	0.0	0.0	8.0
2	EQ5303		CONT	ROLS										

----- EQUIPMENT ENERGY CONSUMPTION--------

Trane Air Conditioning Economics V 600 By: Trane Customer Direct Service Network PAGE 14 EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING ELEC 0 0 0 0 17 66 60 69 17 0 0 0 229 PK 0.0 0.0 0.0 0.0 0.3 0.3 0.3 0.3 0.3 0.0 0.0 0.0 0.3 1 EQ4003 FC CENTRIF. FAN C.V. ELEC 787 712 862 750 1734 1725 1567 1802 1576 825 750 750 13,838 PK 3.7 3.7 3.7 3.7 7.9 7.9 7.8 7.9 7.9 3.7 3.7 3.7 7.9 2 EQ4003 FC CENTRIF. FAN C.V. ELEC 0 0 0 0 33 33 30 34 30 0 0 0 159 PΚ 0.0 0.0 0.0 0.0 0.1 0.1 0.1 0.1 0.1 0.0 0.0 0.0 0.1 4 EQ4381 PROPELLER FAN ELEC 0 0 0 0 0 0 0 0 0 0 0 0 0 PΚ 0.0 0.0 0.0 0.0 0.0 0,0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1 EQ2102 PURCHASED DIST. HOT WATER P HOTH20 1247 1190 644 122 0 0 0 0 0 96 433 1000 4,731 6.8 PΚ 6.8 6.8 6.8 0.0 0.0 0.0 0.0 0.0 6.7 6.8 6.8 6.8 1 EQ5020 HEAT WATER CIRC. PUMP C.V. ELEC 13 12 7 2 0 0 0 0 0 1 5 12 53

PΚ

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UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
BASE BUILDING

	UTILITY PEAK	CHEC	KSUMS
Utility ELECTRIC DEM	AND		
Peak Value 163.7 Yearly Time of Peak 1	· ·		
Hour 15 Month 7			
Eqp. Ref. Equipment Num. Code Name	Equipment Description	Utility Demand (kW)	Percnt Of Tot (%)
Cooling Equipment			
	AIR-CLD COND COMP <15 TONS AIR-CLD COND COMP <15 TONS	76.1 9.7	46.47 5.95
Sub Total		85.8	52.42
Sub Total		0.0	0.00
Air Moving Equipment			
1 2	SUMMATION OF FAN ELECTRICAL DEMAND SUMMATION OF FAN ELECTRICAL DEMAND	7.8 0.1	4.79 0.09
Sub Total		8.0	4.88
Sub Total		0.0	0.00
Miscellaneous			
Lights Base Utilities Misc Equipment Sub Total			42.71 0.00 0.00 42.71
Grand Total		163.7	100.00

V 600

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      TRACE 600 ANALYSIS
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 46

Weather File Code: CARLISLE Location: ENERGY SAVINGS OPPORTUNITY STUDY 40.2 (dea) Latitude: Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 92 (F) Summer Design Dry Bulb: Summer Design Wet Bulb: 72 (F) Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 Air Density: 0.0742 (Lbm/cuft) Air Specific Heat: 0.2444 (Btu/lbm/F) Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (8tu-min./hr/cuft) Enthalpy Factor: 4.4519 (Lb-min./hr/cuft) Design Simulation Period: May To September System Simulation Period: January To December Cooling Load Methodology: CLTD/CLF (Transfer Function Method) Time/Date Program was Run: 14: 6:20 1/13/94 Dataset Name:

CB46 .TM

AIRFLOW - ALTERNATIVE 2 WALL & ROOF INSULATION

------SYSTEM SUMMARY--------(Design Airflow Quantities)

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	1,684	15,551	15,651	18,685	4,718	0	0
2	PTAC	0	1,402	1,402	1,844	442	0	0
3	RAD	0	. 0	0	0	282	0	0
4	ИH	0	0	4,192	0	1,730	0	0
Totals		1,684	16,952	21.244	20,529	7,172	0	0

CAPACITY - ALTERNATIVE 2
WALL & ROOF INSULATION

----- Cooling ------ Heating ------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) 37.4 37.4 -373,976 1 SZ 0.0 0.0 0 0 0 0 0 -373,976 0.0 0 4.1 0 2 PTAC 0.0 4.1 -52,014 0 0 0 -52,014 0 0 0 0 0 3 RAD 0.0 0.0 0.0 -33,1130 0 -33,113 4 UH 0.0 0.0 0 0.0 0.0 -223,7750 0 0 -223,775 0 -682,878 Totals 41.5 0.0 41.5 -682,878 0 0 0 0.0

The building peaked at hour 16 month 7 with a capacity of 41.1 tons

ENGINEERING CHECKS - ALTERNATIVE 2
WALL & ROOF INSULATION

			Percent	***************************************					Heating		
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft	
1	Main	SZ	10.83	0.91	415.3	454.7	26.39	0.92	-21.96	17,026	
2	Main	PTAC	0.00	1.01	344.2	340.6	35.23	1.01	-37.50	1,387	
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-39.90	830	
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.42	-22.64	9,886	

System 1 Peak SZ - SINGLE ZONE

					********	******				***** HEA	TING COIL F	EAK *	******
	t Time ==		Mo/Hr:	7/16		;	k Mo,	/Hr: 7	/16 *		Mo/Hr: 13	/ 1	
Outside	Air ==>	OA	DB/WB/HR: '	91/ 73/ 98.	0	;	k 04	ADB: 9	1 *		OADB:	4	
*						;	ķ		*				
		Space	Ret. Air	Ret: Air	Net	Percnt :	k St	oace	Percnt *	Space Pea	ak Coil f	eak	Percnt
	5	Sens.+Lat.	Sensible	Latent	. Total	Of Tot	sensi	ible	Of Tot *	Space Sei	ns Tot S	ens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	k (8t	tuh)	(%) *	(Btul	h) (Bt	uh)	(%)
Skylit	e Solr	0	0		0	0.00	ţ .	0	0.00 *	•	Ó	Ó	0.00
Skylit	e Cond	0	0		0	0.00	ķ .	0	0.00 *		0	0	0.00
Roof C	ond	0	23,745		23,745	5.28	ķ	0	0.00 *		0 -19,	416	5.69
Glass	Solar	70,848	0		70,848			968	25.82 *		0	0	0.00
Glass	Cond	19,448	, 0		19,448	4.33		852	6.93 *		33 -95,	233	27.90
Wall C		3,242	1,046		4,289	0.95	,	301	1.15 *	,			4.50
Partit		. 0	,		0	0.00		0	0.00 *		0	0	0.00
	d Floor	0			0	0.00		0	0.00 *		0	Õ	0.00
Infilt		112,335			112,335			389	17.94 *		-		61.92
Sub To		205,873	24,791		230,664			510	51.85 *	•			100.00
Internal		100,070	21,771		200,004	31.00		, 510	*	,	10 341,	JJ2	100.00
Lights		112,625	0		112,625			108	40.54 *		0	۸	0.00
People		32,391	V		32,391	7.21		271	5.33 *		0	0	
Misc		02,371	0	0	32,371	0.00	,	0	0.00 *		0	0	0.00
	tal-+\	145,016	0	0	145,016	32.27		380	45.87 *		-	0	0.00
Ceiling		8,029	-8,029	V	145,010	0.00			2.28 *		0	0	0.00
Outside		0,027	0,027	0	=							0	0.00
Sup. Fan		V	U	V	64,425			0	0.00 *		0	0	0.00
Ret. Fan			0		12,164	2.71			0.00 *			0	0.00
Duct Hea			0		0	0.00			0.00 *			0	0.00
		0	U		0	0.00		۸	0.00 *			0	0.00
OV/UNDR		V	-2,905	^	0	0.00		0	0.00 *		0	0	0.00
Exhaust					-2,905	-0.65			0.00 *			0	0.00
Terminal	bypass		0	0	0	0.00			0.00 *			0	0.00
0	4.1	750 010	17 057		110 7/1		k		*				
Grand 10	tal>	358,918	13,857		447,364	100.00	286,	427	100.00 *	-323,87	/8 -341,	332	100.00
					ELECTION								
			Sens Cap.					_		Gross Tota		s (sf	) (%)
W . V	(Tons)	(Mbh)	(Mbh)		Deg F Deg				Grains		17,026		
Main Clg	37.4	449.4			78.0 65				66.7	Part	0		
Aux Clg	0.0	0.0	0.0	0		0.0		0.0	0.0	Exflr	0		
Opt Vent	0.0		0.0	0	0.0 0	0.0	0.0	0.0	0.0		7,846		0 0
Totals	37.4	449.4								Wall	5,950	1,7	76 30
	HEATIN	IG COIL SEL	ECTION		AIR	FLOWS (cfm	1)	E	NGINEERING	CHECKS	TEMPERA	TURES	(F)
	Capacit	y Coil A	irfl Ent	Lvg	Type	Cooling	Heating	Clg	% OA	10.8	Type	Clg	
	(Mbh)	(cf	m) Deg F	Deg F	Vent	1,684	0	Clg	Cfm/Sqft	0.91	SADB	58.1	
Main Htg	-374.			87.0	Infil		3,035		Cfm/Ton		Plenum	76.5	
Aux Htg	0.			0.0			15,651		Sqft/Ton		Return	76.5	
Preheat	-0.			57.4	Mincfm	0	0		Btuh/Sqft		Ret/OA	78.0	
Reheat	0.		0 0.0	0.0	Return		15,651		People	61	Runarnd	75.0	
Humidif	0.			0.0		1,684	0		% OA		Fn MtrTD	0.2	
Opt Vent	0.		0 0.0	0.0	Rm Exh	0	0		Cfm/SqFt		Fn BldTD	0.1	
Total	-374.				Auxil	0	0		Btuh/SqFt		Fn Frict	0.4	
<del>-</del>						•	·	9	· · / • · · · ·	H-1/V	, II 1 1 4 G U	V. 7	•

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

					******					***** HEAT]		
Peaked a Outside	t Time ==		Mo/Hr:		٨			/Hr: 7	•		Mo/Hr: 13/	1
0015106	HIL>	UR	מא/מט/אני	91/ 74/105.	U		* 0;	ADB: S	91 * *		OADB: 4	
•		Space	Ret. Air	Ret. Air	Net.	Percnt	* Si	расе	Percnt *	Space Peak	Coil Pe	ak Perci
	S	ens.+Lat.	Sensible			Of Tot	,		Of Tot *			
Envelope		(Btuh)	(Btuh)		(Btuh)			tuh)	(%) *	•		
Skylit	e Solr	0	0		0			Ó	0.00 *		•	0.0
Skylit	e Cond	0	0		0	0.00	*	0	0.00 *		)	0 0.0
Roof C			3,463		3,463	7.09	*	0	0.00 *		-3,5	
Glass	Solar	11,232	0		11,232	22.98	* 10	944	32.93 *	(	-	0 0.0
Glass	Cond	3,009	. 0		3,009	6.16	* 3	180	9.57 *	-15,443	-15,4	
Wall C	ond	462	158		620	1.27	*	483	1.45 *	-1,563	-2,1	
Partit	ion	0			0	0.00	*	0	0.00 *	. (	)	0 0.0
Expose	d Floor	0			0	0.00	*	0	0.00 *	(	)	0 0.0
Infilt	ration	19,100			19,100	39.08	* 7,	623	22.94 *	-30,795	-30,7	95 59.3
Sub To	tal==>	33,803	3,620		37,423	76.58	* 22,	231	66.90 *	-47,801	-51,8	98 100.0
Internal							*		*			
Lights		8,687	0		8,687	17.78	* 8,	914	26.83 *	(	)	0 0.0
People		2,558			2,558			167	3.51 *	(	)	0.0
Misc		0	0	0	0			0	0.00 *	(	)	0 0.0
Sub To		11,246	0	-	11,246			081	30.34 *	(	)	0.0
Ceiling		762	-762		0	0.00		917	2.76 *	-917	•	0.0
Outside		0	0	0	0			0	0.00 *	C	)	0.0
Sup. Fan					199				0.00 *			0 0.0
Ret. Fan			0		0				0.00 *			0.0
Duct Hea		^	0		0				0.00 *	_		0.0
OV/UNDR	_	0	Λ	^	0			0	0.00 *	(	)	0 0.0
Exhaust			0	· ·	0				0.00 *			0 0.0
Terminal	bypass		0	0	0		* *		0.00 *			0.0
Grand To	tal\	45 011	2,858	. 0	40 040	100.00		220	100 00 *	40.716	r 1 0	00 100 /
diana io	ta1/	43,011	2,030		40,000	100.00	*	229	100.00 *	-48,718	-51,8	98 100.0
			C00	LING COIL S	ELECTION					~~~~~	AREAS	
	Total (	Capacity	Sens Cap.	Coil Airfl	Enteri	ng DB/WB/H	R Leav	ing D8	3/₩8/HR	Gross Total	Glass	(sf) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De	g F Grain	s Deg F	Deg F	Grains	Floor 1	,387	
Main Clg	4.1	48.9	35.8	1,402	76.7 6.	3.0 66.	5 53.1	50.9	53.2	Part	0	
Aux Clg	0.0	0.0	0.0	0		0.0 0.		0.0	0.0	Exflr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0 0.	0.0	0.0	0.0		, 387	0
Totals	4.1	48.9								Wall	867	288 3
******	HFATINO	G COTT SELL	FCTTON		ΔΙ	RELOWS (of	m)	5	NGINEERING	CHECKS	TEMPERAT	110ES (E)
		y Coil A			Туре	Cooling	Heating					Clg Htg
:		(cfi			Vent	0			Cfm/Sqft			53.2 99.
Main Htg	-52.0				Infil	442	442		Cfm/Ton			76.7 65.
Aux Htg	0.0	,					1,402		Sqft/Ton			76.7 65.
Preheat	-0.0		402 65.9		Mincfm	0	0	-	Btuh/Sqft			76.7 65.
Reheat	0.0		0 0.0		Return		1,402		People			75.0 68.
Humidif	0.0		0 0.0		Exhaust	0	0		, % OA	0.0	Fn MtrTD	0.0 0.
Opt Vent	0.0		0 0.0		Rm Exh	0	0	-	Cfm/SqFt	1.01	Fn BldTD	0.0 0.
Total	-52.0				Auxil	0	0	_	Btuh/SqFt		Fn Frict	0.1 0.
								_	. , , -			

System 3 Block RAD - RADIATION

OADB/WB/HR: 0/ 0/ 0.0 OADB: 0 OADB: 4 Outside Air ==> \* Space Ret. Air Ret. Air Net Percht \* Space Percht \* Space Peak Coil Peak Percht Sens.+Lat. Sensible Latent Total Of Tot \* Sensible Of Tot \* Space Sens Tot Sens Of Tot (Btuh) (Btuh) (%) \* Envelope Loads (Btuh) (Btuh) (Btuh) (%) \* (Btuh) (Btuh) (%) Skylite Solr 0 0 0 0 0.00 \* 0 0.00 \* 0 0.00 0 0.00 \* 0 0 0.00 0 0.00 \* 0 -1,904 5.75 0 0.00 \* 0 0 0.00 0 0.00 \* -10,295 -10,295 31.09 Skylite Cond 0 0 0 0.00 \* 0 0 Roof Cond 0 0.00 \* 0 0 Glass Solar 0.00 \* 0 0 0 Glass Cond 0.00 \* 0 0.00 \* -965 -1,289 Wall Cond 0 0.00 \* 3.89 0 0 0 0.00 \* 0 Partition 0.00 \* 0.00 0 0 0.00 \* Exposed Floor 0 0.00 \* 0 0.00 Infiltration 0 0.00 \* -19,624 -19,624 59.26 0.00 \* -30,884 -33,113 100.00 0 0 0 0.00 \* 0 0.00 \* Sub Total:=> Internal Loads \* 0 0.00 \* 0 0.00 \* Lights 0 0 0 0.00 \* 0.00 \* 0 People 0 0 0.00 \* 0 0 0.00 0 Misc 0 0 0 0 0.00 \* 0 0.00 \* 0 0.00 0 0 0.00 \* Sub Total:=> 0 ٥ 0 0.00 \* 0 0.00 Ceiling Load 0 0.00 \* -2,221 0 0 0 0.00 \* 0.00 Outside Air 0.00 \* 0 0 0 0.00 \* 0 0.00 0.00 \* Sup. Fan Heat 0 0.00 \* 0.00 0.00 \* 0.00 \* Ret. Fan Heat 0 0 0.00 \* 0.00 Duct Heat Pkup 0 0 0.00 \* 0 0.00 0.00 \* OV/UNDR Sizing Exhaust Heat 0 0.00 \* 0 0.00 0 0 0.00 \* 0 0.00 \* 0 0.00 Terminal Bypass 0 0 0 0.00 \* 0.00 \* 0 0.00 \* Grand Total==> 0 0 0 0 0.00 \* 0 0.00 \* -33,105 -33,113 100.00 Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 830 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Main Clg 0.0 0.0 Part 0 Aux Clg 0.0 0.0 0.0 0 0.0 0.0 0.0 0.0 0.0 ExFlr 0 Opt Vent 0.0 0.0 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 Roof 830 0 0 Totals 0.0 0.0 553 Wall 192 35 Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 0.0 Type Clg Htg (Mbh) (cfm) Deg F Deg F Vent 0 0 Clg Cfm/Sqft 0.00 0.0 68.1 SADB 0 0.0 0.0 -33.1 282 Clg Cfm/Ton Main Htq 0.00 Infil 0 Plenum 0.0 59.8 0 Clg Sqft/Ton 0.00 0.0 0 0 Aux Htg 0.0 0.0 Supply Return 0.0 59.9 0.0 0 0.0 Preheat 0.0 Mincfm 0 O Cla Btuh/Saft 0.00 Ret/OA 0.0 59.9 0 O No. People 0 Runarnd Reheat 0.0 0 0.0 0.0 Return 0.0 68.0 0 0 0 0 Htg % OA 0.0 Fn MtrTD 0.0 0 Htg Cfm/SqFt 0.00 Fn BldTD 0.0 0 Htg Btuh/SqFt -39.90 Fn Frict 0.0 0.0 0.0 Exhaust Humidif 0.0 0.0 Fn MtrTD 0.0 0.0 Opt Vent 0.0 0 0.0 0.0 Rm Exh 0.0 0.0 Total -33.1 Auxil 0.0

System 4 Block UH - UNIT HEATERS

	: Time ==:		Mo/Hr: (				*		/Hr: 0	/ 0 *		Mo/Hr: 13/	1	
Outside A	ir ==>	0AI	DB/W8/HR:	0/ 0/ 0.0	)		*	0/	ADB:	0 *		OAD8: 4		
		Space	Ret. Air	Ret. Air	Ne	et Per	cnt *	Sı	pace	Percnt *	Space Pea	k Coil Pe	ak P	ercnt
	Se	ens.+Lat.	Sensible	Latent	. Tota	l Of	Tot *	Sensi		Of Tot *	Space Sen			f Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh	1)	(%) *	(81	tuh)	(%) *	(Btuh	) (Btu	h)	(%)
Skylite	Solr	0	0			0 0	* 00.		0	0.00 *		0	0	0.00
Skylite	Cond	0	0			0 0	.00 *		0	0.00 *		0	0	0.00
Roof Co	ind	0	0			0 0	* 00.		0	0.00 *		0 -20,7	21	9.34
Glass S	Golar	0	0			0 0	.00 *		0	0.00 *		0	0	0.00
Glass C	ond	0	0			0 0	.00 *		0	0.00 *	-73,35	5 -73,3	55	33.08
Wall Co	nd	0	0		•	0 0	.00 *		0	0.00 *	-5,21	9 -7,2	22	3.26
Partiti	.on	0				0 0	.00 *		0	0.00 *		0	0	0.00
Exposed	i Floor	0				0 0	* 00.		0	0.00 *		0	0	0.00
Infiltr	ation	0				0 0	.00 *		0	0.00 *	-120,46	4 -120,4	64	54.32
Sub Tot	:al==>	0	0			0 0	* 00.		0	0.00 *	-199,03	7 -221,7	62 1	00.00
Internal	Loads						*			*				
Lights		0	0			0 0	.00 *		0	0.00 *		0	0	0.00
People		0				0 0	.00 *		0	0.00 *		0	0	0.00
Misc		0	0	0		0 0	.00 *		0	0.00 *		0	0	0.00
Sub Tot	al==>	0	0	0		0 0	.00 *		0	0.00 *		0	0	0.00
Ceiling L	.oad	0	0			0 0	.00 *		0	0.00 *	-22,97	6	0	0.00
Outside A	ir	0	0	0		0 0	.00 *		0	0.00 *		0	0	0.00
Sup. Fan	Heat					0 0	.00 *			0.00 *			0	0.00
Ret. Fan	Heat		0			0 0	.00 *			0.00 *			0	0.00
Duct Heat	: Pkup		0			0 0	.00 *			0.00 *			0	0.00
OV/UNDR S	Sizing	0				0 0	.00 *		0	0.00 *		0	0	0.00
Exhaust H			0	0			.00 *			0.00 *			0	0.00
Terminal	Bypass		0	0		0 0	.00 *			0.00 *			0	0.00
	•		_				*			*		_		
Grand Tot	al==>	0	0	0		0 0	.00 *		0	0.00 *	-222,01	3 -221,7	62 1	100.00
			cool	LING COIL S	ELECTION							AREAS		
	Total (		Sens Cap.			_	/WB/HR			/₩B/HR	Gross Tota	l Glass	(sf)	(%)
	(Tons)	(Mbh)	(MPP)	(cfm)	Deg F D	_	Grains	-	_	Grains	Floor	9,886		
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0		
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0		8,985		) 0
Totals	0.0	0.0									Wall	3,392	1,368	3 40
	HEATING	G COIL SEL	ECTION		A	AIRFLOW	S (cfm)		E	NGINEERING	CHECKS	TEMPERAT	URES (	(F)
	Capacity		irfl Ent			Cool		Heating		% OA	0.0	Type	Clg	Htg
:	(Mbh)				Vent		0	0	Cla	Cfm/Sqft		SADB	0.0	
Main Htg	-223.8			-	Infil		0	1,730	Clg	Cfm/Ton		Plenum	0.0	60.1
Aux Htg	0.0	0	0.0		Supply		0	4,192		Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0		0.0		Mincfm		0	0		Btuh/Sqft		Ret/OA	0.0	68.0
	0.0		0.0		Return		0	4,192		People	0	Runarnd	0.0	68.0
Reheat								-						
	0.0	0	0.0	0.0	Exhaust		0	0	Hta	1 % UA	0.0	Fn MtrTD	0.0	0.0
Reheat Humidif Opt Vent	0.0		0 0.0		Exhaust Rm Exh		0	0		⊦% OA ⊦Cfm/SqFt	0.0 0.42	Fn MtrTD Fn BldTD	0.0 0.0	0.0 0.0

BUILDING U-VALUES - ALTERNATIVE 2 WALL & ROOF INSULATION

----- BUILDING U-VALUES-----

		Room U-Values (Btu/hr/sqft/F)					Room	Room				
n -					•	i/nr/sqt					Mass	Capac.
Room			>	Summr	Wintr		Summr	Wintr			(1b/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	45.6	9.75
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	45.6	9.75
2	LIQUOR STORE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.058	0.317	101.9	22.09
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.058	0.317	101.9	22.09
4	LIBRARY	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
5	GAME ROOM	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
System	<ol> <li>Total/Ave.</li> </ol>	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	50.2	11.09
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	77.9	17.56
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
8	2ND FL TOILETS	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	64.3	14.59
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	64.3	14.59
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	80.2	18.06
3	LIQUOR STORAGE	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	30.1	6.35
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	30.1	6.35
4	LIBRARY	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
5	GAME ROOM	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.4	11.03
Buildin	g	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	51.8	11.58

BUILDING AREAS - ALTERNATIVE 2 WALL & ROOF INSULATION

------ 8 U I L D I N G A R E A S ------

				•									
				Floor	Total		Exposed						
			er of	Area/Dupl	Floor	Partition	Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room		Dupl:		Room	Area	Area	Area	Area	/Rf	Area	Area	/Wl	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	1ST FL OFFICES	1	1	8,053	8,053	0	0	0	0	0	624	24	1,926
Zone	<pre>1 Total/Ave.</pre>				8,053	0	0	0	0	0	624	24	1,926
2	LIQUOR STORE	1	1	1,127	1,127	0	0	0	0	0	0	0	739
Zone	2 Total/Ave.				1,127	0	0	0	0	0	0	0	739
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	4.3	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
System	<pre>1 Total/Ave.</pre>				17,026	0	û	0	0	7,846	1,776	30	4,174
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
System	2 Total/Ave.				1,387	0	0	0	0	1,387	288	33	579
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
8	2ND FL TOILETS	1	1	582	582	0	0	0	0	582	96	34	184
Zone	8 Total/Ave.				582	0	0	0	0	582	96	34	184
System	3 Total/Ave.				830	0	0	0	0	830	192	35	360
3	LIQUOR STORAGE	1	1	901	901	0	0	0	0	0	24	18	112
Zone ,	3 Total/Ave.			-	901	0	0	0	0	0	24	18	112
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				- 3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
System	4 Total/Ave.				9,886	0	0	0	0	8,985	1,368	40	2,023
Buildin	g				29,129	0	0	0	0	19,048	3,624	34	7,137

ASHRAE 90 ANALYSIS - ALTERNATIVE 2 WALL & ROOF INSULATION

----- A S H R A E 9 O A N A L Y S I S -----

Overall Roof U-Value = 0.041 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.311 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.139 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 2.27 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 32.24 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 WALL & ROOF INSULATION

## System Totals

Percent	Cool	ing Loa	id	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	_	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	2.1	6	54	-34,144	27	468	1,062.2	0	0	0.0	0	0
5 - 10	4.2	5	50	-68,288	23	410	2,124.4	0	0	0.0	0	0
10 - 15	6.2	6	58	-102,432	17	307	3,186.6	0	0	0.0	0	0
15 - 20	8.3	6	61	-136,576	1	10	4,248.8	59	3,638	0.0	0	0
20 - 25	10.4	5	48	-170,720	3	. 55	5,311.0	0	0	0.0	0	0
25 - 30	12.5	8	75	-204,863	1	23	6,373.2	0	0	0.0	0	0
30 - 35	14.5	10	99	-239,007	1	25	7,435.4	0	0	0.0	0	0
35 - 40	16.6	4	36	-273,151	2	37	8,497.5	0	0	0.0	0	0
40 ~ 45	18.7	7	64	-307,295	0	8	9,559.7	0	0	0.0	0	0
45 - 50	20.8	10	94	-341,439	0	0	10,621.9	0	0	0.0	0	0
50 - 55	22.8	2	18	-375,583	2	42	11,684.1	24	1,450	0.0	0	0
55 - 60	24.9	6	60	-409,727	2	42	12,746.3	0	0	0.0	0	0
60 - 65	27.0	5	50	-443,871	19	338	13,808.5	0	0	0.0	0	0
65 - 70	29.1	5	46	-478,015	0	0	14,870.7	0	0	0.0	0	0
70 - 75	31.1	3	25	-512,159	0	0	15,932.9	0	0	0.0	0	0
75 - 80	33.2	6	60	-546,303	0	0	16,995.1	10	638	0.0	0	0
80 - 85	35.3	4	37	-580,447	0	0	18,057.3	7	432	0.0	0	0
85 - 90	37.4	0	0	-614,591	0	0	19,119.5	0	0	0.0	0	0
90 - 95	39.4	2	15	-648,734	0	0	20,181.7	0	0	0.0	0	0
95 - 100	41.5	3	30	-682,878	0	0	21,243.9	0	0	0.0	0	0
Hours Off	0.0	0	7,780	0	0	6,995	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 WALL & ROOF INSULATION

			<b>-</b>		BUI	LDI	N G	T E M	PER	ATU	R E P	R 0 F	I L E S
÷													
Temperature										Zone N	umber		
Range (F)	1	2	4	5	6	7	. 7	8	3	4	5	6	
Max. Temp.	83.1	79.3	87.6	86.3	85.0	86.6	108.9	110.0	169.5	115.2	114.2	110.0	
Mo./Hr.	7 19	7 23	7 21	7 21	7 20	7 20	8 20	8 21	9 19	7 20	7 20	8 19	
Day Type	4	1	4	4	4	4	1	1	2	2	2	1	
									Mod	mhar n	f Hour	c	
Above 100	0	0							3,420				
95 - 100	0		0		-		935						
90 - 95	0												
90 - 93 85 - 90	0	-			-	-				334	359		
	•	-			•					480			
80 - 85	871			1,292		1,093							
75 - 80				2,116	-	-			1,173				
70 - 75		1.368							1,329		529		
65 - 70	*	2,206					-		348				
60 - 65		1,333			1,163					783		1,050	
55 - 60	427	571	1,255	395	306	567	618	520	199	474	499	562	
50 - 55	328	365	708	1,421	1,433	1,281	692	679	82	667	819	749	
Below 50	357	169	1,142	1,448	1,585	1,352	0	0	0	0	0	0	
Min. Temp.	42.0	45.1	37.9	34.8	35.5	38.2	54.9	54.9	54.9	54.9	54.9	54.9	
Mo./Hr.	2 7	2 7	2 8	2 7	2 8	2 8	1 9	1 11	1 4	1 11	1 10	2 10	
Day Type	5	5		5									

By: Trane Customer Direct Service Network

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

------ MONTHLY ENERGY CONSUMPTION-----

	ELEC Off Peak	DEMAND On Peak	HOT WTR On Peak	HOT W DMND On Peak
Month	(k₩h)	(kW)	(Therm)	(Thrm/hr)
Jan	14,119	73	700	4
Feb	12,774	73	689	4
March	15,460	73	347	4
April	13,441	73	65	4
May	17,659	130	0	0
June	21,053	138	0	0
July	22,678	141	0	0
Aug	22,284	138	. 0	0
Sept	16,358	135	0	0
Oct :	14,785	73	42	4
Nov	13,442	73	176	4
Dec	13,446	73	535	4
Total	197,497	141	2,554	4

Building Energy Consumption = 31,910 (Btu/Sq Ft/Year)
Source Energy Consumption = 81,121 (Btu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

----- EQUIPMENT ENERGY CONSUMPTION------- EQUIPMENT ENERGY

	Equip						thly Cons							
um	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	0ct	Nov	Dec	Total
0	LIGHTS													
	ELEC	13433	12154	14712	12793	14073	14073	12793	14712	12793	14073	12793	12793	161,198
	PK	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	₽K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD				•									
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	ÞΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	ÞΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161		AIR-	CLD COND	COMP <1	LS TONS								
	ELEC	0	0	0	0	1671	4323	6799	4733	1672	0	0	0	19,199
	ŘΚ	0.0	0.0	0.0	0.0	48.3	50.2	51.9	50.3	48.4	0.0	0.0	0.0	51.9
1	EQ5200		COND	ENSER FA	NS									
	ELEC	0	0	. 0		157	. 386	658	428	167	0	0	0	1,795
	PK	0.0	0.0	0.0	0.0	2.3	3.7	4.7	4.0	3.1	0.0	0.0	0.0	4.7
1	EQ5303		CONT	ROLS										
	ELEC	0	0	0	0	52	66	60	69	47	0	0	0	294
	PΚ	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161		ATR-	CLD COND	) COMP <1	IS TONS								
-	ELEC	0	0	0	0	41	460	746	514	141	0	0	0	1,902
	PK	0.0		0.0		4.9	5.5	5.6	5.5	5.3	0.0	0.0	0.0	5.6
2	EQ5200		רחמר	ENSER FA	NS									
•	ELEC	0		0		4	41	72	47	15	0	0	0	179
	PK	0.0		0.0	0.0	0.2	0.4	0.5	0.4	0.3	0.0	0.0	0.0	0.5

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

	ELEC	0	0	0	0	12	66	60	69	28	0	0	0	235
	PΚ	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	679	615	744	647	1621	1612	1464	1685	1471	712	647	647	12,544
	PΚ	3.2	3.2	3.2	3.2	7.4	7.4	7.3	7.4	7.4	3.2	3.2	3.2	7.4
2	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	0	0	0	0	26	26	24	28	24	0	0	0	128
	PK	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
4	EQ4381		PROP	ELLER FA	N									
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2102		PURC	HASED DI	ST. HOT	WATER								
	P HOTH20	700	689	347	65	0	0	0	0	0	42	176	535	2,554
	ÞΚ	4.2	4.2	4.2	4.2	0.0	0.0	0.0	0.0	0.0	4.2	4.2	4.2	4.2
1	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	6	6	3	1	0	0	0	0	0	0	2	5	23
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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UTILITY PEAK CHECKSUMS - ALTERNATIVE 2 WALL & ROOF INSULATION

-----UTILITY PEAK CHECKSUMS-----

Utility	ELECTRIC	DEMAND
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Peak Value 140.6 (kW) Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment	: Description	Utility Demand (kW)	Percnt Of Tot (%)
Cooling E	quipment				
1 2	EQ1161 EQ1161	AIR-CLD COND COMP <15 TONS AIR-CLD COND COMP <15 TONS		56.8 6.4	40.39 4.58
Sub Total	l			63.2	44.97
Sub Total	i			0.0	0.00
Air Movin	ng Equipment				
1 2		SUMMATION OF FAN ELECTRICAL SUMMATION OF FAN ELECTRICAL		7.3 0.1	5.21 0.09
Sub Total	l			7.4	5.29
Sub Total	l			0.0	0.00
Miscellar	neous				
Lights Base Uti Misc Equ Sub Total	uipment			69.9 0.0 0.0 69.9	49.74 0.00 0.00 49.74
Grand Tot	tal			140.6	100.00

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      TRACE 600 ANALYSIS
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 46

Weather File Code: CARLISLE Location: **ENERGY SAVINGS OPPORTUNITY STUDY** Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) Summer Design Wet Bulb: 72 (F) Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: Q.20 Winter Ground Relectance: 0.20 Air Density: 0.0742 (Lbm/cuft) Air Specific Heat: 0.2444 (8tu/lbm/F) Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft) Enthalpy Factor: 4.4519 (Lb-min./hr/cuft) Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

14:37:47 1/13/94 : Time/Date Program was Run: Dataset Name:

CB46 .TM

AIRFLOW - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

			***********	Main			Auxil.	Room
System	System	Outside Airflow	Cooling Airflow	Heating Airflow	. Return Airflow	Exhaust Airflow	Supply Airflow	Exhaust Airflow'
Number	Type	(Cfm)	(Cfm)	(Cfm)	(Cfm)	(Cfm)	(Cfm)	(Cfm)
1	SZ	1,788	16,245	16,345	20,272	5,715	0	0
2	PTAC	0	1,669	1,669	2,242	572	0	0
3	RAD	0	0	0	0	365	0	0
4	HU	0	0	6,035	0	2,238	0	0
Totals		1,788	17,914	24,050	22,514	8,890	0	0

CAPACITY - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

----- Cooling ------ Heating ------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) 0 0 0 -664,375 0 0 0 -85,172 0 0 0 0 -49,312 0 0 0 0 -349,136 0 0 0 -1,147,995 48.8 -664,375 6.2 -85,172 0.0 -49,312 1 SZ 48.8 0.0 0.0 0 -62,143 6.2 0.0 0.0 0.0 0 0 2 PTAC 0.0 3 RAD 0.0 0 0 0 4 UH 0.0 0.0 0.0 0.0 -349,136 Totals 55.0 0.0 0.0 55.0 -1,147,995 0 -62,143

The building peaked at hour 16 month 7 with a capacity of 54.6 tons

ENGINEERING CHECKS - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

----- ENGINEERING CHECKS------ENGINEERING

1			Percent		ing					
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
ĺ	Main	SZ	11.00	0.95	332.7	348.7	34.42	0.96	-39.02	17,026
2	Main	PTAC	0.00	1.20	271.0	225.1	53.30	1.20	-61.41	1,387
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-59.41	830
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.61	-35.32	9,886

System 1 Peak SZ - SINGLE ZONE

A	: Time ==		Mo/Hr:					Hr:			Mo/Hr: 13		
Uutside A	ıır ::>	UA	DB/WB/HR:	91/ /4/105.0	)		* 0A *	108:	91 * *		OAD8:	4	
		Space	Ret. Air	Ret. Air	Net	Percnt	* Sp	ace	Percnt *	Space Pe	ak Coil P	eak	Percnt
	S	ens.+Lat.	Sensible	Latent	. Total	Of Tot			Of Tot *				Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(8tuh)	(%)	* (8t	uh)	(%) *	(Btu	h) (Bt		(%)
Skylite	Solr	0	0		0	0.00	*	0	0.00 *		0	Ó	0.00
Skylite			0		0	0.00	*	0	0.00 *		0	0	0.00
Roof Co	nd	0	124,323		124,323	21.22	*	0	0.00 *		0 -90,	278	16.49
Glass S		70,848	0		70,848	12.09	* 73,	968	22.41 *		0		0.00
		19,448	. 0		19,448	3.32		852	6.02 *	-95,2	33 <b>-</b> 95,	233	17.40
Wall Co		18,393	3,691		22,084	3.77	,		5.93 *		14 -88,	321	16.14
Partiti		0			0	0.00			0.00 *				0.00
Exposed		0			0	0.00			0.00 *		0		0.00
Infiltr		150,905			150,905					,			49.97
Sub Tot		259,594	128,014		387,608		•	614	54.43 *	-436,6	45 -547,	330	100.00
Internal							*		*				
Lights		98,893	0		98,893			940			0	0	0.00
		32,428			32,428		•		4.65 *		0	0	0.00
Misc		0	0	-	0			0	0.00 *		0	0	0.00
Sub Tot		131,321	0	-	131,321			272			0	0	0.00
-			-42,371		0	0.00	•		10.03 *	,		0	0.00
		0	0	0	70,355			0	0.00 *		0	0	0.00
Sup. Fan			2		12,707	2.17			0.00 *			0	0.00
Ret. Fan			0		0				0.00 *			0	0.00
Duct Heat		۸	0		0	0.00		^	0.00 *		•	0	0.00
OV/UNDR S	-	0	-16,041	٨	0 -14 041			0	0.00 *		0	0	0.00
Terminal			-10,041	0	-16,041 0				0.00 *			0	0.00
151 111111111111	uypass		V	V	V		* *		0.00 *			0	0.00
Grand   Tot	al::>	433,286	69,602	. 0	585,950		•	998	100.00 *	-466,5	10 -547.	330	100.00
			:::::::::::::::::::::::::::::::::		ELECTION					Gross Tota			) (%)
	(Tons)	(Mbh)	•		Deg F Deg			-	Grains	Floor		5 (51,	) (*)
Main Clg	48.8	586.0	443.4	16,245			-		64.9	Part			
Aux Clg	0.0	0.0	0.0	•		0.0 0.0		0.0		ExFlr	Ö		
	0.0	0.0		0	0.0 0	0.0		0.0		Roof			0 0
Totals		586.0							3,3	Wall	5,950		
	HFATTN	G COTE SEL	FCTION		AIR	FINMS (of	m )	1	ENGINEERING	CHECKS	TEMPERA	THOCO	(E)
			irfl Ent			Cooling	", Heating		g % OA		Туре	Clg	Htg
!	(Mbh)			-	Vent		0		g Cfm/Sqft		SAD8	56.3	
Main Htg	-664.	•			Infil	3.927	3,927	010	g Cfm/Ton		Plenum	82.9	
Aux Htg	0.4	0	0 0.0	0.0	Supply	16,245	16,345		g Sqft/Ton		Return	83.0	
_	-62.	1 16.5	245 52.1		Mincfm	0	0	-	g Btuh/Sqft		Ret/OA	83.8	58.0
	0.0	0	0.0				16,345	-	. People		Runarnd	75.0	68.0
Reheat					- 1			11.1	0.04				
Reheat Humidif	0.0	0	0.0	0.0	Exhaust	1,/88	Q.	Htc	g % UA	0.0	Fn MtrTD	0.2	0.7
	0.0	0	0 0.0		Rm Exh	1,788 0	0	Ht.	g % OA g Cfm/SqFt	0.0 0.96	Fn MtrTD Fn BldTD	0.2	

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

	********* t Time ==>		DOLING COIL Mo/Hr:	PEAK *****	********	******		SPACE /Hr:		***** HEAT	ING COIL F Mo/Hr: 13		******
Outside (				7/14 91/ 74/105.0	)			ADB:				4	
		Space		Ret. Air	Net	Percnt	* S	pace	Percnt *	Space Pea	ak Coil F	eak	Percnt
		ns.+Lat.	Sensible		Total			ible	Of Tot *	Space Ser			Of Tot
Envelope		(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	* (B	tuh)	(%) *	(Btul	n) (8t	uh)	(%)
Skylite		0	0		0	0.00	*	0	0.00 *		0	0	0.00
Skylite	e Cond	0	0		0	0.00	*	0	0.00 *		0	0	0.00
Roof Co		0	21,292		21,292	28.80	*	0	0.00 *		0 -17,	685	20.76
Glass S		11,232	0		11,232	15.19	* 10	,944	27.14 *		0	0	0.00
Glass (		3,009	0		3,009	4.07	* 3	,180	7.89 *	-15,44	13 -15,	443	18.13
Wall Co		2,731	553		3,285	4.44		,977	7.38 *	-9,25	54 -12,	222	14.34
Partiti		0			0	0.00		0	0.00 *		0	0	0.00
Exposed	d Floor	0			0	0.00	*	0	0.00 *		0	0	0.00
Infilta		24,717			24,717	33.43	* 9	,865	24.46 *	-39,85	53 -39,	853	46.77
Sub Tot		41,690	21,845		63,535	85.94	<b>*</b> 26	,967	66.87 *	-64,55	50 -85,	203	100.00
Internal							*		*				
Lights		7,601	0		7,601	10.28	* 7	,800	19.34 *		0	0	0.00
People		2,558			2,558	3.46		,167	2.89 *		0	0	0.00
Misc		0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
Sub! Tot	tal==>	10,160	0	0	10,160	13.74	* 8	,967	22.24 *		0	0	0.00
Ceiling t		3,973	-3,973		0	0.00	* 4	, 392	10.89 *	-4,02	22	0	0.00
Outside A	Air	0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
Sup. Fan					237	0.32	*		0.00 *			0	0.00
Ret. Fan	Heat		0		0	0.00	*		0.00 *			0	0.00
Duct Heat			0		0	0.00	*		0.00 *			0	0.00
OV/UNDR S	-	0			0	0.00	*	0	0.00 *		0	0	0.00
Exhaust H			0	0	0	0.00	*		0.00 *			0	0.00
Terminal	Bypass		0	0	0	0.00	*		0.00 *			0	0.00
İ					•		*		*				
Grand Tot	tal==>	55,823	17,872	0	73,932	100.00	* 40	,326	100.00 *	-68,57	'2 -85 <b>,</b>	203	100.00
	Total Ca			LING COIL SE		g D8/W8/		Leaving D8/W8/HR			 Gross Total Glass (sf		
1	(Tons)	(Mbh)		Coil Airfl				_				5 (51	) (4)
Main Clg	6.2	73.9	(Mbh) 57.4	(cfm) . 1,669	Deg F Deg 83.8 65			50.2	Grains 51.3	Floor Part	1,387		
Aux Clg	0.0	0.0	0.0	1,007			.0 0.0	0.0		Exflr	0		
Opt Vent	0.0	0.0	0.0	0			.0 0.0	0.0			1,387		0 0
Totals		73.9	V.V	V	<b>V.</b> V V	.0 0	.0 0.0	۷.۷			867		88 33
	HEATING	COIL SELE	ECTION		AIR	FLOWS (c	fm)		ENGINEERING	CHECKS	TEMPERA	TURES	(F)
		Coil Ai	irfl Ent	Lvg	Type		Heating	Cl	g % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfa	n) Deg F	Deg F	Vent	0	0	Cl	g Cfm/Sqft	1.20	SADB	52.8	105.7
Main Htg	-85.2		669 58.9	105.7	Infil	572	572	Cl	g Cfm/Ton	270.97	Plenum	84.0	<b>58.</b> 9
Aux Htg	0.0		0.0	0.0	Supply	1,669	1,669	Cl	g Sqft/Ton		Return	83.8	<b>58.</b> 9
Preheat	-0.0		669 58.9	52.7	Mincfm	0	0	Cl	g Btuh/Sqft		Ret/OA	83.8	<b>58.</b> 9
Reheat	0.0		0.0	0.0	Return	1,669	1,669	No	. People	5	Runarnd	75.0	68.0
Humidif	0.0		0.0	0.0	Exhaust	0	0	Нt	g % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0		0.0	0.0	Rm Exh	0	0	Ht	g Cfm/SqFt	1.20	Fn BldTD	0.0	0.0
ope tone						•	•		3 - 1 , 1				

System 3 Block RAD - RADIATION

	******** ;		OOLING COIL Mo/Hr: (		******	******	***** *			PEAK **** )/ 0  *				******
Outside A				0/ 0/ 0.	0		*		ADB:	0 *		Mo/Hr: 13 OADB:	4	
							*			*				
	0-	Space	Ret. Air			et Perci			pace	Percnt *	•			Percnt
Envalana		ns.+Lat.	Sensible	Latent	Tota			Sens		Of Tot *	•			Of Tot
Envelope Skylite		(Btuh) O	(Btuh)	(Btuh)	(Btul		k) *	(8)	tuh)	(%) *	•		uh)	(%)
Skylite		0	0				00 * 00 *		0	0.00 *		0	0	0.00
Roof Co		0	0				)() *		0	0.00 * 0.00 *		V 0 (	714	0.00
Glass S		0	0				00 *		0	0.00 *		0 -0, n	714 0	13.61
Glass C		0	0				)0 *		0	0.00 *		U 5 _10	-	0.00
Wall Co		0	٥				00 *		0	0.00 *	•			20.88
Partiti		0	V				)0 *		0	0.00 *		1 -6, 0	0	14.01
Exposed		0					00 *		0	0.00 *		0	0	0.00
Infiltr		0					00 *		0	0.00 *		-	-	51.50
Sub Tot		0	0	•			00 *		0	0.00 *				100.00
Internal		v	V			0 0.1	*		V	V.VV +		J -47,	312	100.00
Lights		0	0			0 0.0	)0 *		0	0.00 *		0	0	0.00
People		0	·				)0 *		0	0.00 *		<b>0</b>	0	0.00
Misc		0	0	0			00 *		0	0.00 *		Λ	0	0.00
SubiTot	al==>	0	0	0		0 0.0			0	0.00 *		0	0	0.00
Ceiling L		0	0	•		0 0.0			Ô	0.00 *		-	0	0.00
Outside A		0	0	0		0 0.0			0	0.00 *	,	0	0	0.00
Sup. Fan		-	•	•		0 0.0			•	0.00 *		V	0	0.00
Ret. Fan			0			0 0.0				0.00 *		•	0	0.00
Duct Heat			0			0 0.0				0.00 *			0	0.00
OV/UNDR S	-	0					)0 *		0	0.00 *		0	0	0.00
Exhaust H	-		0	0		0 0.0			•	0.00 *		•	0	0.00
Terminal	Bypass		0	0		0 0.0				0.00 *			0	0.00
Į.					•		*			*				
Grand Tot	al==>	0	0	. 0		0 0.0	00 *		0	0.00 *	-49,20	8 -49,	312	100.00
				ING COIL S								AREAS		
i	Total C	, ,	Sens Cap.			ing DB/W				/W8/HR	Gross Tota	l Glas	s (sf	) (%)
	(Tons)	(Mbh)	(Mbh)		. Deg F D			-	-	Grains	floor	830		
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0			0.0	Part	0		
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0		830		0 0
Totals	0.0	0.0									Wall	553	1'	92 35
	HEATING	COIL SELE	ECTION		A	IRFLOWS	(cfm)		8	NGINEERING	CHECKS	TEMPERA	TURES	(F)
			irfl Ent	Lvg	Type	Coolir		Heating		1 % OA		Type	Clg	Htg
	(Mbh)	(cfr		-	Vent		0	0	Clg	Cfm/Sqft	0.00	SADB	0.0	
Main Htg	-49.3		0.0	0.0	Infil		0	365	Clg	Cfm/Ton	0.00	Plenum	0.0	<b>38.</b> 8
Aux Htg	0.0		0.0	0.0	Supply		0	0	Clg	Sqft/Ton	0.00	Return	0.0	39.0
Preheat	0.0		0.0	0.0	Mincfm		0	0		Btuh/Sqft		Ret/OA	0.0	39.0
Reheat	0.0		0.0	0.0	Return		0	0		People	0	Runarnd	0.0	
				^ ^	F., L									Λ.
Humidif	0.0		0.0	0.0	Exhaust		0	0		1 % OA		Fn Mtr⊺D	0.0	
Humidif Opt Vent Total	0.0 0.0 -49.3		0 0.0	0.0	Rm Exh Auxil		0	0	Htg	i % UA   Cfm/SqFt   Btuh/SqFt	0.00	fn MtrlD fn BldTD fn Frict	0.0	

System 4 Block UH - UNIT HEATERS

	t Time ==>		•	0/0			*			0/0		Mo/Hr: 1		
Outside A	ir ==>	0A	DB/WB/HR:	0/ 0/ 0.	0		*	04	ADB:	0 *		OADB:	4	
		Space	Ret. Air	Ret. Air	Net	Percr	nt *	S	oace	Percnt *	Space Pe	ak Coil	Peak	Percnt
	Se	ns.+Lat.	Sensible	Latent	Total	Of To	t *	Sensi	ible	Of Tot *				Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%	<b>(3)</b>	(81	tuh)	(%) *			tuh)	(\$)
Skylite	e Solr	0	0		0	0.0	0 *		0	0.00		0	0	0.00
Skylite	e Cond	0	0		0	0.0	)0 *		0	0.00 *		0	0	0.00
Roof Co	ond	0	0		0	0.0	)0 *		0	0.00 *		0 -74	,057	21.67
Glass S	Solar	0	0		0	0.0	00 *		0	0.00 *		0	0	0.00
Glass (	Cond	0	0		0	0.0	00 *		0	0.00 *	-73,3	55 -73	,355	21.47
Wall Co	ond	0	0		0	0.0	)() *		0	0.00 *	-30,8	99 -38	,407	11.24
Partiti	on	0			0	0.0	)0 *		0	0.00 *		0	0	0.00
Exposed	d Floor	0			0	0.0	00 *		0	0.00 *		0	0	0.00
Infilt	ation	0			0	0.0	00 *		0	0.00 *	-155,8	94 -155	,894	45.62
Sub Tot	cal==>	0	0		0	0.0	00 *		0	0.00 *				100.00
Internal	Loads						*			*	-		,	
Lights		0	0		0	0.0	0 *		0	0.00 *		0	0	0.00
People		0			0		0 *		0	0.00 *		0	0	0.00
Misc		0	0	0	0		00 *		0	0.00 *		0	0	0.00
Sub! Tot	al==>	0	0	0	0		00 *		0	0.00 *		0	0	0.00
Ceiling t	.oad	0	0		0		0 *		0	0.00 *		80	0	0.00
Outside A		0	0	0	0		00 *		0	0.00 *	•	0	0	0.00
Sup. Fan	Heat				0		00 *			0.00 *		-	0	0.00
Ret. Fan	Heat		0		. 0		00 *			0.00 *		•	0	0.00
Duct Heat			0		0		00 *			0.00 *			0	0.00
OV/UNDR S	•	0			0		* 00		0	0.00 *		0	0	0.00
Exhaust H	-		0	0	0		00 *			0.00 *		·	0	0.00
Terminal			0	0	0		* 0			0.00 *			0	0.00
}	,,						*			*			•	****
Grand Tot	al==>	0	0	0	0	0.0	00 *		0	0.00 *	-345,0	28 -341	,713	100.00
			c00	LING COIL S	ELECTION							AREAS-		·
1	Total Ca	apacity	Sens Cap.	Coil Airfl	Enteri	ng DB/W	18/HR	Leav	ing D	B/WB/HR	Gross Tot	al Gla	ss (sf	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De	g F Gr	ains	Deg f	Deg F	Grains	Floor	9,886		
lain Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0		
ux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
lpt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	8,985		0 0
otals	0.0	0.0									Wall	3,392	1,3	368 40
	HEATING	COIL SEL	ECTION		AII	RFLOWS	(cfm)			ENGINEERING	CHECKS	TEMPER	ATURES	(F)
	Capacity			Lvg	Type	Coolin	1g	Heating	Cl	g % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfi	-	Deg F	Vent		0	0	Cl	g Cfm/Sqft	0.00	SADB	0.0	120.5
ain Htg	-349.1	6,	035 67.4	120.5	Infil		0	2,238	Cl	g Cfm/Ton	0.00	Plenum	0.0	39.6
ux Htg	0.0		0.0	0.0	Supply		0	6,035	Cl	g Sqft/Ton	0.00	Return	0.0	68.0
reheat	0.0		0.0	0.0	Mincfm		0	0	Cl	g Btuh/Saft	0.00	Ret/OA	0.0	
eheat	0.0		0.0	0.0	Return		0	6,035		. People	0	Runarnd	0.0	
umidif	0.0		0.0	0.0	Exhaust		0	0	Ht	g % OA	0.0	Fn MtrTD	0.0	
lpt Vent	0.0		0.0	0.0	Rm Exh		0	0		g Cfm/SqFt	0.61	Fn BldTD	0.0	
otal	-349.1				Auxil		0	0		g Btuh/SqFt		Fn Frict		

BUILDING U-VALUES - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

BUILDING U-VALUES-----

		Room U-Values							Room	Room		
						ı/hr/sqf	t/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
2	LIQUOR STORE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone ;	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
System	i Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	49.2	10.88
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	<ol><li>Total/Ave.</li></ol>	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	75.9	17.16
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
8	2ND FL TOILETS	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
System	<ol><li>3 Total/Ave.</li></ol>	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	78.1	17.65
3	LIQUOR STORAGE	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	47.0	10.75
Buildin	g	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	50.5	11.33

BUILDING AREAS - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

				Floor	Total		Exposed						
		Numbe	er of	Area/Dupl	Floor	Partition	Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room		Dupli	icate	Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	1ST FL OFFICES	1	1	8,053	8,053	0	0	0	0	0	624	24	1,926
Zone	<pre>1 Total/Ave.</pre>				8,053	0	0	0	0	0	624	24	1,926
2	LIQUOR STORE	1	1	1,127	1,127	0	0	0	0	0	0	0	739
Zone	2 Total/Ave.				1,127	0	0	0	0	0	0	0	739
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Ione	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
System	<pre>1 Total/Ave.</pre>				17,026	0	0	0	0	7,846	1,776	30	4,174
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone :	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
System	2 Total/Ave.				1,387	0	0	0	0	1,387	288	33	579
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	. 96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	17€
8	2ND FL TOILETS	1	1	582	582	0	0	0	0	582	96	34	184
Zone	8 Total/Ave.				582	0	0	0	0	582	96	34	184
System	3 Total/Ave.				830	0	0	0	0	830	192	35	360
3	LIQUOR STORAGE	1	1	901	901	0	0	0	0	0	24	18	112
Zone	<pre>3 Total/Ave.</pre>				901	0	0	0	0	0	24	18	112
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	<b>73</b> 3
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone :	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
6	2ND FL OFFICES	1	1	1,139	. 1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
System	4 Total/Ave.				9,886	0	0	0	0	8,985	1,368	40	2,023
Buildin	g				29,129	. 0	0	0	0	19,048	3,624	34	7,137

ASHRAE 90 ANALYSIS - ALTERNATIVE 3 REPLACE FLUORESCENT LAMPS

----- A S H R A E 9 O A N A L Y S I S ------

Overall Roof U-Value = 0.232 (Btu/Hr/Sq Ft/F) Overall Wall U-Value = 0.500 (Btu/Hr/Sq Ft/F) Overall Building U-Value = 0.329 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 18.58 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 33.33 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3 REPLACE FLUORESCENT LAMPS

## System Totals

Percent	Cool	ing Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	2.7	5	39	-60,507	24	558	1,202.5	0	0	0.0	0	0
5 - 10	5.5	11	89	-121,014	29	672	2,405.0	0	0	0.0	0	0
10 - 15	8.2	0	0	-181,521	19	442	3,607.4	0	0	0.0	0	0
15 - 20	11.0	7	53	-242,027	3	68	4,809.9	0	0	0.0	0	0
20 - 25	13.7	5	42	-302,534	1	24	6,012.4	0	0	0.0	0	0
25 - 30	16.5	11	86	-363,041	2	35	7,214.9	59	3,638	0.0	0	0
30 - 35	19.2	2	18	-423,548	1	23	8,417.4	0	0	0.0	0	0
35 - 40	22.0	7	58	-484,055	0	7	9,619.8	0	0	0.0	0	0
40 - 45	24.7	9	71	-544,562	2	42	10,822.3	0	0	0.0	0	0
45 - 50	27.5	6	51	-605,069	2	42	12,024.8	0	0	0.0	0	0
50 - 55	30.2	5	43	-665,576	10	229	13,227.3	0	0	0.0	0	0
55 - 60	33.0	11	90	-726,083	7	162	14,429.8	24	1,450	0.0	0	0
60 ~ 65	35.7	2	19	-786,589	0	0	15,632.2	0	0	0.0	0	0
65 - 70	38.5	5	38	-847,096	0	0	16,834.7	0	0	0.0	0	0
70 - 75	41.2	8	65	-907,603	0	0	18,037.2	17	1,070	0.0	0	0
75 - 80	44.0	2	15	-968,110	0	0	19,239.7	0	0	0.0	0	0
80 - 85	46.7	1	5	-1,028,617	0	0	20,442.2	0	0	0.0	0	0
85 - 90	49.5	2	20	-1,089,124	0	0	21,644.6	0	0	0.0	0	0
90 - 95	52.2	0	0	-1,149,631	0	0	22,847.1	0	0	0.0	0	0
95 - 100	55.0	0	0	-1,210,138	0	0	24,049.6	0	0	0.0	0	0
Hours Off	0.0	0	7,958	0	0	6,456	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3 REPLACE FLUORESCENT LAMPS

					BUI	L D I	NG	TEM	PER	ATU	R E P	R 0 F	I L E S
Temperature										Zone N	umber ·		
Range (F)	1	2	4	5	6	7	. 7	8	3	4	5	6	
Max. Temp.	83.5	81.1	89.9	88.9	87.3	87.5	104.0	103.9	127.7	108.8	107.8	104.1	
Mo./Hr.			7 20								7 19		
Day Type	4	4	4	4	4	4	1	2	2	1	2	2	
					• • • • • •	<b></b> .			Nu	mber o	f Hours	3	
Above 100	0	0	0	0	0	0	543	558	2,928	1,241	1,005	549	
95 - 100	0	0	0	0	0	0	1,348	958	226	924	757	1,006	
90 - 95	0	0	0	0	0	0	824	1,008	305	657	804	991	
85 - 90	0	0	218	154	110	132	475	474	645	649	556	452	
80 - 85	820	274	1,443	1,305	993	1,070	482	674	48	201	480	674	
75 - 80	2,451	2,477	1,788	1,848	2,194	2,255	34	0	746	51	70	0	
70 - 75	773	938	482	399	409	317	353	238	1,088	661	388	84	
65 - 70	2,053	2,157	590	604	386	427	1,917	2,007	1,531	1,750	1,735	2,015	•
60 - 65	1,019	1,325	759	544	779	1,060	1,061	1,051	489	924	987	1,102	
55 - 60	631	730	635	716	664	499	743	782	282	718	799	779	
50 - 55	377	336	823	655	660	885	980	1,010	472	984	1,179	1,108	
Below 50	636	523	2,022	2,535	2,565	2,115	0	0	0	0	0	0	
Min. Temp.	37.0	39.0	34.5	32.1	33.2	36.2	54.9	54.9	54.9	54.9	54.9	54.9	
Mo./Hr.	2 7	2 7			2 8	2 9	1 5	1 6	1 1	1 6	1 4	1 5	
Day Type	5	5	4	5	5	4	3	2	4	2	3	2	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3 REPLACE FLUORESCENT LAMPS

------ MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	12,515	65	1,276	7
Feb	11,323	65	1,217	7
March	13,700	65	681	7
April	11,909	65	143	7
May	15,523	144	0	. 0
June	19,806	149	0	0
July	22,550	152	0	0
Aug	20,755	149	0	0
Sept	14,080	145	0	0
Oct	13,099	65	109	7
Nov	11,912	65	458	7
Dec	11,919	65	1,031	7
Total	179.092	152	4,915	7

Building Energy Consumption = 37,859 (Btu/Sq Ft/Year) Floor Area = 29,129 (Sq Ft) Source Energy Consumption = 85,458 (Btu/Sq Ft/Year)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 REPLACE FLUORESCENT LAMPS

----- EQUIPMENT ENERGY CONSUMPTION-----

ef	Equip					noM	thly Cons	sumption						
lum	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS ELEC PK	11754 61.2	10635 61.2	12873 61.2	11194 61.2	12314 61.2	12314 61.2	11194 61.2	12873 61.2	11194 61.2	12314 61.2	11194 61.2	11194 61.2	141,048 61.2
1	MISC LD ELEC PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0 0.0
2	MISC LD GAS PK	0.0	0.0	0.0	0	0	0	0	0	0.0	0	0	0 0.0	0.0
3	MISC LD OIL PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0
4	MISC LD P STEAM PK	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0
5	MISC LD P HOTH2O PK	0.0	0.0	0.0	0.0	0	0.0	0	0	0.0	0.0	0	0 0.0	0.0
6	MISC LD P CHILL PK	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0
1	EQ1161 ELEC PK	0	AIR- 0 0.0	-CLD CONG 0 0.0	O COMP <: 0 0.0	15 TONS 1209 62.9	4630 65.4	7873 67.6	4858 65.6	1063 63.2	0.0	0.0	0 0.0	19,633 67.6
1	EQ5200 Elec PK	0	CONE 0 0.0	DENSER FA 0 0.0	2M4 0 0.0	126 3.3	426 5.1	763 6.0	454 5.0	112 3.7	0.0	0	0 0.0	1,880 6.0
1	EQ5303 Elec PK	0.0	CON1 0 0.0	TROLS 0 0.0	0	24 0.3	66 0.3	60 0.3	69 0.3	22 0.3	0.0	0	0 0.0	241 0.3
2	EQ1161 ELEC PK	0.0	AIR- 0 0.0	-CLD CONC 0 0.0	0 COMP <	15 TONS 98 7.9	545 8.3	950 8.5	589 8.3	95 8.0	0.0	0	0 0.0	2,277 8.5
2	EQ5200 ELEC PK	0	CONE 0 0.0	DENSER FA 0 0.0	2NF 0 0.0	10 0.3	51 0.6	92 0.8	56 0.6	10 0.5	0	0	0 0.0	219 0.8
2	EQ5303		CONI	rrols										

Trane Air Conditioning Economics V 600 By: Trane Customer Direct Service Network PAGE 44 EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 REPLACE FLUORESCENT LAMPS ELEC 0 0 0 0 17 59 60 63 17 0 0 0 217 PK 0.0 0.0 0.0 0.0 0.3 0.3 0.3 0.3 0.3 0.0 0.0 0.0 0.3 1 EQ4003 FC CENTRIF. FAN C.V. ELEC 748 677 819 712 1693 1684 1530 1539 784 1760 712 712 13,369 PΚ 3.6 3.6 3.6 3.6 7.7 7.7 7.6 7.7 7.7 3.6 3.6 3.6 7.7 2 EQ4003 FC CENTRIF. FAN C.V. ELEC 0 0 0 0 31 31 29 33 29 0 0 0 153 PK 0.0 0.0 0.0 0.0 0.1 0.1 0.1 0.1 0.1 0.0 0.0 0.0 0.1 4 EQ4381 PROPELLER FAN ELEC 0 0 0 0 0 0 0 0 0 0 0 0 0 PΚ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1 EQ2102 PURCHASED DIST. HOT WATER P HOTH20 1276 1217 681 143 0 0 0 0 0 109 458 1031 4,915 PK 6.8 6.8 6.8 6.8 0.0 0.0 0.0 0.0 0.0 6.6 6.8 6.8 6.8 1 EQ5020 HEAT WATER CIRC. PUMP C.V. ELEC 13 12 8 2 0 0 0 0 0 1 6 13 55 PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

Sub Total

Lights

Sub Total

Grand Total

Miscellaneous

Base Utilities

Misc Equipment

	LITY PEAK CHECKSUM LACE FLUORESCENT L							
	*****************		U T I L	ITY PEA	K CHEC	KSUMS	 	
Uti	lity ELECTRIC DE	MAND						
	k Value 152.5 rly Time of Peak							
Hou	r 15 Month 7							
	. Equipment . Code Name		Equipment	Description	Utility Demand (kW)	Of Tot		
Cool	ling Equipment							
1 2		AIR-CLD COND COMP				48.49 6.29		
Sub	Total				83.5	54.77		
Sub	Total				0.0	0.00		
Air	Moving Equipment							
1 2		SUMMATION OF FAN SUMMATION OF FAN			7.6 0.1	5.02 0.09		
Sub	Total				7.8	5.11		

0.0 0.00

61.2 40.12

0.0 0.00

61.2 40.12

152.5 100.00

0.00

0.0

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Trane Air Conditioning Economics
By: Trane Customer Direct Service Network
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 46

Dataset Name:

Weather File Code:	CARLIS	LE
Location:	ENERGY	SAVINGS OPPORTUNITY STUDY
Latitude:	40.2	(deg)
Longitude:	77.2	(deg)
Time Zone:	5	
Elevation:	475	(ft)
Barometric Pressure:	29.2	(in. Hg)
Summer Clearness Number:	1.00	
Winter Clearness Number:	1.00	
Summer Design Dry Bulb:	92	(F)
Summer Design Wet Bulb:	72	(F)
Winter Design Dry Bulb:	4	(F)
Summer Ground Relectance:	0.20	
Winter Ground Relectance:	0.20	
Air Density:		(Lbm/cuft)
Air Specific Heat:		(8tu/lbm/F)
Density-Specific Heat Prod:		(Btu-min./hr/cuft/F)
Latent Heat Factor:		(Btu-min./hr/cuft)
Enthalpy Factor:	4.4519	(Lb-min./hr/cuft)
Design Simulation Period: May	To :	September
System Simulation Period: Janu		
Cooling Load Methodology:	CLTD/CLF	(Transfer Function Method)
- t - t-		
Time/Date Program was Run:	15: 9:1	0 1/13/94

C846 .TM

AIRFLOW - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

				Main			Auxil.	Room
System	System	Outside Airflow	Cooling Airflow	Heating Airflow	. Return Airflow	Exhaust Airflow	Supply Airflow	Exhaust Airflow
Number	Type	(Cfm)	(Cfm)	(Cfm)	(Cfm)	(Cfm)	(Cfm)	(Cfm)
1	SZ	1,731	15,864	15,964	19,891	5,658	0	0
2	PTAC	0	1,608	1,608	2,180	572	0	0
3	RAD	0	. 0	0	0	365	0	0
4	UH	0	0	6,035	0	2,238	0	0
Totals		1.731	17,472	23,607	22,071	8,833	0	0

CAPACITY - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

------ Cooling ------ Heating -------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Capacity Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) 1 SZ 47.2 0.0 0.0 47.2 -662.886 0 -67,477 0 -662,886 0 0 0 0 0 0 0 0 0 0 6.1 0.0 0.0 0.0 0.0 0.0 6.1 -84,944 2 PTAC 0 0 0 -84,944 0.0 - 49,3120 3 RAD 0 0 -49,312 0 4 UH 0.0 0.0 0.0 0.0 -349,136 0 0 -349,136 0.0 53.2 -1,146,277 Totals 53.2 0.0 0 -67,477 0 -1,146,277

The building peaked at hour 16 month 7 with a capacity of 52.9 tons

ENGINEERING CHECKS - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

----- ENGINEERING CHECKS-------ENGINEERING

			Percent		Cool:	ing		Heat		
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft
1	Main	SZ	10.91	0.93	336.3	360.9	33.25	0.94	-38.93	17,026
2	Main	PTAC	0.00	1.16	265.2	228.8	52.45	1.16	-61.24	1,387
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-59.41	830
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.61	-35.32	9,886

System 1 Peak SZ - SINGLE ZONE

		>		7/14	_		•	rio,		7/16	k	Mo/Hr:		
Jutside A	ır ::>	0A	D8/WB/HR:	91/ 74/105.	0		*	01	ADB:	91	<b>k</b>	OADB:	4	
		Space	Ret. Air	Ret. Air	Net	Perchi		S	nace	Percnt 4		esk Coi	l Peak	Percn
	S	ens.+Lat.		Latent					ible				t Sens	Of To
Envelope		(Btuh)		(Btuh)						(%)				(\$
Skylite	Solr	0	0	(504)	(5541)	) 0.00	) *		0	(°)	(00	υπ <i>)</i> Λ	(00011)	(1
Skylite	Cond	0	0 0 124,323		Ì	0.00			0	0.00	t	0	^	0.0 0.0
Pont Co	nd	0	124.323		124 323	71 04	<b>.</b> *		0	0.00	<b>,</b>	0 -0	0 279	16.
Glass S	olar	70.848	124,323		70.848	12.51	*	7.3	,968	23 36 3	<b>K</b>	^ .	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	0.0
Glass C	ond	19,448	0		70,848 19,448 22,064	3 3.44	i *	19	,852	0.00 × 0.	-95	v 277 -√	25 277	17.4
Wall Co	nd	18,393	3,672		22,064	3.90	· ) *	19	.556	6.17	-67	914 -	88 307	16
Partiti	on	0			(	0.00			0	0.00	ν,	/14 ( //	00,007	0.6
Exposed	Floor	0			(	0.00			Ô	0.00		0	٥	0.
Infiltr	ation	148.637			148,637			66	-		-273,			
	al==>	257.325	127,995		385,320					56.71				
nternal		, ,	, , , , ,		-30,02	, 00.00		117	, • • •	30.71 ·		J. J.	77,010	100.
		84,765	0		84.765	14.97	7 *	87	.377	27.59		0	0	0.0
People		32,428	·		72 420	5.73			.332	4.84	(	0	0	0.0
Misc		. 0	0	0	(	0.00			0	0.00		0	0	0.0
Sub Tot	al==>	117,194	0	0	117.194	20.70			,709			0	0	0.0
eiling L	oad	42,679	-42,679		(	0.00					-30,	•	0	0.0
utside A	ir	0	-42,679 0	0	66,988				0	0.00	(		0	0.0
up. Fan	Heat				12,410				-	0.00 *		•	0	0.4
et. Fan	Heat		0		, (					0.00 *			0	0.0
uct Heat	Pkup		0		(	0.00				0.00 *			0	0.0
V/UNDR S	izing	0	·		C				0	-0.00 *		0	0	0.0
xhaust H	eat		-15,769	0						0.00 *		•	0	0.0
erminal	8ypass		0	0	. 0	0.00	*			0.00 *			0	0.0
1										*			_	
rand Tota	al==>	417,198	69,547	. 0	566,142	100.00	*	316,	,709	100.00 *	-467,0	05 -54	7,316	100.0
:			coo	LING COIL S	ELECTION							AREAS	}	
	Total (	Capacity	Sens Cap.	Coil Airfl	Enteri	ng D8/W8	/HR	Leav	/ing D	8/W8/HR	Gross Tot	tal Gl	ass (s	f) (%
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De	g F Gra	ins	Deg F	Deg F	Grains	Floor		•	,
			428.3	15,864	83.8 6	7.0 7	4.8	55.9	55.3	65.8	Part			
x Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		ExFlr	0		
	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	7,846		0
tals	47.2	566.1									Wall	5,950	1,	776
	HEATIN	G COIL SEL	ECTION			RFLOWS (	cfm)			ENGINEERING	CHECKS	TEMPE	RATURES	S (F)
	Capacity				Type	Cooling		Heating		g % OA	10.9	Type	Clg	
ţ	(Mbh)	(cfi	n) Deg F		Vent	1,731		0	Cl	g Cfm/Sqft	0.93	SADB		
in Htg	-662.		964 56.7	94.9	Infil	3,927	•	3,927	Cl	g Cfm/Ton	336.26	Plenum	82.	
x Htg	0.0		0.0	0.0	Supply	15,864		15,964	Cl	g Sqft/Ton	360.88	Return	83.0	
eheat	-67.	•	864 52.0	55.9	Mincfm	0	1	0		g Btuh/Sqft		Ret/OA	83.	
heat	0.0		0.0	0.0	Return	15,864		15,964	No	. People	61	Runarnd		
midif	0.0		0.0	0.0	Exhaust	1,731		0	Ht	g % OA	0.0	Fn MtrT		
t Vent	0.0		0.0	0.0	Rm Exh	0		0		g Cfm/SqFt		fn BldT		
tal	-662.9	7			Auxil	0		0		g Btuh/SqFt		Fn Fric		

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

	t Time ==								/Hr:		<b>K</b>	,	: 13/ 1	
UUTS1de i	Air ==>	UA	IDR/MR/HK:	91/ 74/105.	0		*	04	AD8:	′ <b>-</b>	<b>K</b> <b>K</b>	OADB:	: 4	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	S	pace	Percnt *		ak Coj	il Peak	Perch
	S	ens.fLat.	Sensible	Latent	. Total	. Of Tot	*	Sensi		Of Tot >			t Sens	Of To
Envelope	Loads	(Btuh)	(8tuh)	(Btuh)	(Btuh)	(%)	*	(B1	tuh)	(%)	k (Btu		(Btuh)	(*
Skylite			0		(	0.00	*		0	0.00	,	٨	Ò	0.0
Skylit	e Cond	0	0		(	0.00	*		0	0.00	; ;	0	0	0.0
Roof Co	ond	0	21,218		21,218	29.16	*		0	0.00	<b>(</b>	0 -	-17,622	20.7
Glass	Solar	11,232	0		11,232		*	10.	,944	27.83			0	0.0
Glass		3,009	. 0		3,009			3,		8.09 *		143 -	-15,443	18.1
Wall Co		2,731	542		3,274			2,		7.57 *			-12,213	14.3
Partit		0							0	0.00	•		0	0.0
Expose	d Floor	0			(	0.00			0	0.00	<b>(</b>	0	0	0.0
Infilt		24,717			24,717			9.	,865			153 -		46.8
Sub To			21,760		63,450				,967	68.57 *	•	550 -		100.0
Internal		,	,		,		*	,	, , , , ,	*			05,101	100.0
Lights		6,515	0		6,515	8.96	*	6,	. 686	17.00 *	<b>:</b>	0	0	0.0
People		2,558			2,558				,167	2.97 *		Ŏ	0	0.0
Misc		0	0	0					0	0.00 *		0	0	0.0
	tal==>	9,074			9,074				,853	19.97 *		0	0	0.0
		4,073	-4,073		,,,,,				,507	11.46 *		-	0	0.0
Outside 6		0	0		(				0	0.00 *	,	0	0	0.0
Sup. Fan		·	V	V	229				v	0.00 *		V	0	0.0
Ret. Fan			0		(					0.00 *			0	0.0
ouct Heat			0		(					0.00 *			0	0.0
V/UNDR S		0	•						0	0.00 *		0	0	0.0
xhaust 1	_	-	0	0					·	0.00 *		•	0	0.0
Terminal			0	·	C					0.00 *			0	0.0
	-,,		·	·	•	****	*			*			V	0.0
Grand Tot	tal==>	54,837	17,687	. 0	72,753	100.00	*	39,	,327	100.00 *	-68,6	78 -	85,131	100.0
			coo	LING COIL SE	ELECTION							ARF4	\S	
				Coil Airfl										
				(cfm)									(1	., (,,
ain Clg				1,608										
ıx Clg	0.0	0.0	0.0	0			0.0	0.0	0.0		ExFlr	Ö		
t Vent	0.0	0.0	0.0	0			0.0	0.0	0.0		Roof	1,387		0
tals	6.1	72.8									Wall	867		288 3
	HEATIN	G COIL SEL	ECTION		AI	RFLOWS (c	cfm).			ENGINEERING	CHECKS	TEMF	PERATURE	S (F)
	Capacit	y Coil A	irfl Ent		Type	Cooling		Heating		.g % OA	0.0	Туре		
:	(Mbh)	(cf			Vent	0.		Õ		g Cfm/Sqft	1.16	SADB	-	5 107.
ain Htg	-84.	9 1,	608 58.7	107.3	Infil	572		572		g Cfm/Ton		Plenum		
x Htg	0.	0	0 0.0		Supply	1,608		1,608		g Sqft/Ton		Return		
eheat	-0.				Mincfm	0		0		g Btuh/Saft		Ret/OA		
heat	0.		0 0.0	0.0	Return	1,608		1,608		. People	5	Runarr		
midif	0.		0 0.0		Exhaust	0		0		g % OA		Fn Mtr		
t Vent	0.		0 0.0	0.0	Rm Exh	0		0		g Cfm/SqFt		Fn Blo		
	-84.				Auxil	•		•					v , i '	

System 3 Block RAD - RADIATION

	Time ==>	rrrrrr VI	OLING COIL Mo/Hr: 0				*			/ 0 *		Mo/Hr: 13/	
Outside A		DAO		0/ 0/ 0.0	•		*			0 *		OADB: 4	
			,				*			*			
		Space	Ret. Air	Ret. Air	Ne	t Perc	nt *	Sp	ace	Percnt *	Space Peak		
	Se	ns.+Lat.	Sensible	Latent	. Tota			Sensi		Of Tot *	Space Sens		
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh	(	<b>*</b> ) *	(Bt	uh)	(%) *	(Btuh)	(Btuh	) (%)
Skylite	Solr	0	0			0 0.	00 *		0	0.00 *	0		0.00
Skylite	Cond	0	0			0 0.	00 *		0	0.00 *	0		0.00
Roof Co	nd	0	0			0 0.	00 *		0	0.00 *	0	-6,71	4 13.61
Glass S	Solar	0	0			0 0.	00 *		0	0.00 *	0		0.00
Glass C	Cond	0	. 0			0 0.	00 *		0	0.00 *	-10,295	-10,29	5 20.88
Wall Co	ond	0	0		*	0 0.	00 *		0	0.00 *	-5,711	-6,90	7 14.01
Partiti	on	0				0 0.	00 *		0	0.00 *	0		0.00
Exposed	floor	0				0 0.	00 *		0	0.00 *	0		0.00
Infiltr		0				0 0.	00 *		0	0.00 *	-25,396	-25,39	6 51.50
Sub Tot		0	0			0 0.	00 *		0	0.00 *	-41,403		2 100.00
Internal							*			*	ŕ	,	
Lights		0	0			0 0.	00 *		0	0.00 *	0		0.00
People		0	•				00 *		0	0.00 *	0		0.00
Misc		0	0	0			00 *		0	0.00 *	0		0.00
Sub Tot	'al==>	0	Ō	0			00 *		0	0.00 *	0		0.00
Ceiling L		0	0	v			00 *		0	0.00 *	-7,805		0 0.00
Outside A		0	0	0			00 *		0	0.00 *	,,500		0 0.00
Sup. Fan		٧	V	V			00 *		V	0.00 *	v		0 0.00
Ret. fan			0				00 *			0.00 *			0 0.00
Duct Heat			0				00 *			0.00 *			0 0.00
OV/UNDR S		0	V				00 *		0	0.00 *	0		0 0.00
Exhaust H	-	V	0	0			00 *		V	0.00 *	v		0 0.00
Terminal			0	0			00 *			0.00 *			0 0.00
161 #11141	oypass		V	V		v v.	*			*			0.00
Grand Tot	tales)	0	0	. 0		0 0.	00 *		0	0.00 *	-49,208	-49,31	2 100.0
arana rot	vax/	V	V			•	•		v	****	17,200	.,,	
			coot	ING COIL S								AREAS	
	Total C	apacity	Sens Cap.	Coil Airfl		ing D8/				3/₩8/HR	Gross Total	Glass	(sf) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F 1	Deg F G	rains	Deg F	Deg F	Grains	Floor	830	
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	830	0
Totals	0.0	0.0									Wall	553	192 3
	HEATTHA					******	/ n & n \			- 110 T 11 C C C T 110	CHECKE		unco /c)
!			ECTION					Heating		ENGINEERING 3 % OA		TEMPERATU	
		Coil A			Туре	Cooli	•	-		•		• •	
M. J	(Mbh)	•	-	-	Vent		0	745		g Cfm/Sqft g Cfm/Ton			0.0 68. 0.0 38.
Main Htg	-49.3		0 0.0	0.0	Infil		0	365					
Aux Htg	0.0		0 0.0	0.0	Supply		0	0		g Sqft/Ton	0.00		
Preheat	0.0		0 0.0	0.0	Mincfm		0	0		g Btuh/Sqft		Ret/OA	0.0 39.
Reheat	0.0		0 0.0	0.0	Return		0	0		. People		Runarnd	0.0 68.
Humidif	0.0		0 0.0		Exhaust		0	0		g % OA		Fn MtrTD	0.0 0.
Opt Vent	0.0		0 0.0	0.0	Rm Exh		0	0		g Cfm/SqFt			0.0 0.
Total	-49.3	ζ			Auxil		0	0	U +	g Btuh/SqFt	-59.41	Fn Frict	0.0 0.

System 4 Block UH - UNIT HEATERS

					*******	******				***** HEAT			*****
	t Time ==		Mo/Hr: (	•				/Hr: (	•		Mo/Hr: 13	/ 1	
Outside	Air ==>	DAC	OB/WB/HR:	0/ 0/ 0.	0		* 0	ADB:	0 *		OAD8:	4	
•		Space	Ret. Air	Ret: Air	Net	Percnt	* S	pace	Percnt *	Space Pea	k Coil P	eak	Percnt
	Se	ens.+Lat.	Sensible	Latent	. Total	Of Tot	* Sens	ible	Of Tot *	Space Ser			Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(8tuh)	(%)	* (8	tuh)	(%) *	(Btul	n) (Bt	uh)	(%)
Skylit	e Solr	0	0		0	0.00	*	0	0.00 *		0	0	0.00
Skylit	e Cond	0	0		0	0.00	*	0	0.00 *		0	0	0.00
Roof C	ond	0	0		0	0.00	*	0	0.00 *		0 -74,	057	21.67
Glass	Solar	0	0		0	0.00	*	0	0.00 *		0	0	0.00
Glass	Cond	0	. 0		0	0.00	*	0	0.00 *	-73,35	55 -73,	355	21.47
Wall C	ond	0	0		0	0.00	*	0	0.00 *	-30,89	9 -38,	407	11.24
Partit	ion	0			0	0.00	*	0	0.00 *		0	0	0.00
Expose	d Floor	0			0	0.00	*	0	0.00 *		0	0	0.00
Infilt	ration	0			0	0.00	*	0	0.00 *	-155,89	94 -155,	894	45.62
Sub To	tal==>	0	0		0	0.00		0	0.00 *	-260,14			100.00
Internal	Loads						*		*	,	,		
Lights		0	0		0	0.00	*	0	0.00 *		0	0	0.00
People		0			0	0.00		0	0.00 *		0	0	0.00
Misc		0	0	0	0	0.00		0	0.00 *		0	0	0.00
Sub To	tal==>	0	0	0	0	0.00		0	0.00 *		0	0	0.00
Ceiling	Load	0	0		0	0.00		0	0.00 *	-84,88	30	0	0.00
Outside		0	0	0	0		*	0	0.00 *		0	0	0.00
Sup. Fan	Heat				0		*		0.00 *			0	0.00
Ret. Fan			Q		0		<b>*</b>		0.00 *			0	0.00
Duct Hea	t Pkup		0		0	0.00	*		0.00 *			0	0.00
OV/UNDR	Sizing	0			0	0.00	*	0	0.00 *		0	0	0.00
Exhaust	-		0	0	0		*		0.00 *			0	0.00
Terminal	8ypass		0	0	0		*		0.00 *			0	0.00
	• .						*		*			•	
Grand To	tal==>	0	0	0	0	0.00	*	0	0.00 *	-345,02	28 -341,	713	100.00
			C00I	ING COIL S	ELECTION						AREAS		
	Total (	Capacity	Sens Cap.	Coil Airfl	Enteria	ng DB/WB/	HR Lea	ving DE	/W8/HR	Gross Tota	l Glas	s (sf)	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg	g F Grai	ns Deg F	Deg F	Grains	Floor	9,886	` ,	` ,
Main Clg	0.0	0.0	0.0	0	0.0	0.0	.0 0.0	0.0	0.0	Part	0		
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	.0 0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	.0 0.0	0.0	0.0	Roof	8,985		0 0
Totals	0.0	0.0									3,392	1,36	8 40
							fm)		NGINEERING	CHECKS	TEMPERA	TURES	(F)
			rfl Ent	-		Cooling	Heating	-	1 % OA	0.0	Type	Clg	Нtg
	(Mbh)			-	Vent	0	0	Clo	Cfm/Sqft		SADB	0.0	120.5
Main Htg	-349.1	,		120.5	Infil	0	•	Clo	Cfm/Ton		Plenum	0.0	39.6
Aux Hţg	0.0		0.0	0.0	Supply	0	6,035	Clo	Sqft/Ton		Return	0.0	68.0
Preheat	0.0		0.0	0.0	Mincfm	0	0		Btuh/Sqft		Ret/OA	0.0	68.0
Reheat	0.0	0	0.0	0.0	Return	0	6,035		People	0	Runarnd	0.0	68.0
Humidif	0.0	0	0 0.0 0 0.0 0 0.0	0.0	Exhaust	0	0		% 0A	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0		0.0	0.0	Rm Exh	0	0	Htg	Cfm/SqFt	0.61	Fn 8ldTD	0.0	0.0
Total	-349.1	1			Auxil	0	0	Htg	8tuh/SqFt	-35.32	Fn Frict	0.0	0.1

BUILDING U-VALUES - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

											Room	Room
						ı/hr/sqf	t/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
2	LIQUOR STORE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	49.2	10.88
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	75.9	17.16
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
8	2ND FL TOILETS	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	78.1	17.65
3	LIQUOR STORAGE	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
Zone	3 Total/Ave.	0.000	0.000	0,000	0,000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	47.0	10.75
<b>B</b> uildin	,	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	50.5	11.33

BUILDING AREAS - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

				Floor	Total		Exposed						
		Numbe	er of	Area/Dupl	Floor	Partition	Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room		Dupl:	icate	Room	Area	Area	Area	Area	/Rf	Area	Area	/Wl	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	1ST FL OFFICES	1	1	8,053	8,053	0	0	0	0	0	624	24	1,926
Zone	<pre>1 Total/Ave.</pre>				8,053	0	0	0	0	0	624	24	1,926
2	LIQUOR STORE	1	1	1,127	1,127	0	0	0	0	0	0	0	739
Zone	2 Total/Ave.				1,127	0	0	0	0	0	0	0	739
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
System	<pre>1 Total/Ave.</pre>				17,026	0	0	0	0	7,846	1,776	30	4,174
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
System	2 Total/Ave.				1,387	0	0	0	0	1,387	288	33	579
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Ione	7 Total/Ave.				248	0	0	0	0	248	96	35	176
8	2ND FL TOILETS	i	1	582	582	0	0	0	0	582	96	34	184
Zone	8 Total/Ave.				582	0	0	0	0	582	96	34	184
System	3 Total/Ave.				830	0	0	0	0	830	192	35	360
3	LIQUOR STORAGE	i	1	901	901	0	0	0	0	0	24	18	112
Zone	3 Total/Ave.			_	901	0	0	0	0	0	24	18	112
4	LIBRARY	i	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
System	4 Total/Ave.				9,886	0	0	0	0	8,985	1,368	40	2,023
Buildin					29,129	0	0	0	0	19,048	3,624	34	7,137

ASHRAE 90 ANALYSIS - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

----- A S H R A E 9 O A N A L Y S I S -----

Overall Roof U-Value = 0.232 (Btu/Hr/Sq Ft/F) Overall Wall U-Value = 0.500 (Btu/Hr/Sq Ft/F) . Overall Building U-Value = 0.329 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 18.58 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 33.33 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4 REPLACE FLUORESCENT BALLASTS

SYSTEM LOAD PROFILE------

## System Totals

Percent	Cool	ing Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	·
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	2.7	8	64	-60,688	26	621	1,180.4	0	0	0.0	0	0
5 - 10	5.3	7	52	-121,375	28	662	2,360.7	0	0	0.0	0	0
10 - 15	8.0	1	4	-182,063	18	439	3,541.1	0	0	0.0	0	0
15 - 20	10.6	10	79	-242,751	2	52	4,721.5	0	0	0.0	0	0
20 - 25	13.3	7	53	-303,439	2	56	5,901.8	0	0	0.0	0	0
25 - 30	16.0	5	41	-364,126	2	48	7,082.2	59	3,638	0.0	0	0
30 - 35	18.6	7	56	-424,814	1	13	8,262.6	0	0	0.0	0	0
35 - 40	21.3	9	68	-485,502	1	24	9,442.9	0	0	0.0	0	0
40 - 45	24.0	4	32	-546,190	0	0	10,623.3	0	0	0.0	0	0
45 - 50	26.6	11	85	-606,878	2	49	11,803.7	0	0	0.0	0	0
50 - 55	29.3	3	22	-667,565	11	264	12,984.0	0	0	0.0	0	0
55 - 60	31.9	11	87	-728,253	7	162	14,164.4	24	1,450	0.0	0	0
60 - 65	34.6	0	. 0	-788,941	0	0	15,344.8	0	0	0.0	0	0
65 - 70	37.3	5	38	-849,629	0	0	16,525.1	0	0	0.0	0	0
70 - 75	39.9	8	65	-910,316	0	0	17,705.5	17	1,070	0.0	0	0
75 - 80	42.6	2	15	-971,004	0	0	18,885.9	0	0	0.0	0	0
80 - 85	45.3	1	5	-1,031,692	0	0	20,066.2	0	0	0.0	0	0
85 - 90	47.9	3	20	-1,092,379	0	0	21,246.6	0	0	0.0	0	0
90 - 95	50.6	0	0	-1,153,067	0	0	22,427.0	0	0	0.0	0	0
95 - 100	53.2	0	0	-1,213,755	0	0	23,607.3	0	0	0.0	0	0
Hours Off	0.0	0	7,974	0	0	6,370	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4 REPLACE FLUORESCENT BALLASTS

***************************************					BUI	DI	N G	TEM	PER	ATU	R E P	R O F	I L E S
Temperature											umber		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Range (F)	1	2	4	5	6	7	. 7	8	3	4	5	6	
Max. Temp.	83.5	81.1	89.9	88.9	87.3	87.5	103.5	102.9	123.1	107.7	106.6	103.1	
Mo./Hr.	7 20		7 20						8 18		7 20		
Day Type	4	4	4	4	4	4	1	2	2	1	1	2	
									No	mher o	f Hour	2	
Above 100	0	0			0		451		2,912				
95 - 100	0						1,278			1,004		1,116	
90 - 95	0						946					1,044	
85 - 90	0	0	-		110	132	470						
80 - 85	696			1,251		1,061	527						
75 - 80				1,858									
70 - 75		1.040				•			1,017	566		_	
65 - 70	2,074								,		1,793	-	
60 - 65			779				1,044					1,098	
55 - 60	658					493	779						
50 - 55	376	335						1,031			1,183		
Below 50	644			2,624							,	•	
Min. Temp.	7 <i>6</i> 0	70 A	34.4	32.0	77 N	76 1	54.9	54.9	510	510	54.9	5/ 0	
Mo./Hr.	2 7	2 7										1 5	
Day Type					-				3		- '	2	

By: Trane Customer Direct Service Network

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4 REPLACE FLUORESCENT BALLASTS

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND Qn Peak (Thrm/hr)
Jan	10,798	56	1,305	7
Feb	9,770	56	1,244	7
March	11,821	56	719	7
April	10,274	56	171	7
May	13,434	131	0	0
June	17,572	137	0	0
July	20,463	141	0	0
Aug	18,401	138	0	0
Sept	12,169	133	0	0
0ct	11,301	56	122	7
Nov	10,277	56	484	7
Dec	10,284	56	1,061	7
Total	156,565	141	5,105	7

Building Energy Consumption = 35,871 (8tu/Sq Ft/Year)
Source Energy Consumption = 78,407 (8tu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)

2 EQ5303

CONTROLS

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 REPLACE FLUORESCENT BALLASTS

------ EQUIPMENT ENERGY CONSUMPTION------ EQUIPMENT ENERGY

	Equip -	Jan	feb	Mar	Apr	May	thly Cons June	July	Aug	Sep	Oct	Nov	Dec	Tota
		2 3				,		,		004			200	1000
)	LIGHTS ELEC	10075	9115	11034	9595	10555	10555	9595	11074	0505	10555	0505	0505	120.00
	PK	52.4	52.4	52.4	52.4	52.4	52.4	52.4	11034 52.4	9595 52.4	10555 52.4	9595 <b>52.4</b>	9595 52.4	120,89 52.
												•••		01.
1	MISC LD	۸	^	٨	^		٨	^		^	^	^	۸	
	ELEC PK	0 0.0	0.0	0 0.0	0 0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0.0	0
	• • • • • • • • • • • • • • • • • • • •	*.*	• • • • • • • • • • • • • • • • • • • •	***	***	***	***	V. V	0.0	V. V	0.0	V. V	V.V	v
)	MISC LD	•	2					•						
	GAS PK	0.0	0 0.0	0 0.0	0.0	0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0
	1 11	0.0	۷.۷	V.V	V.V	٧.٧	0.0	٧.٧	0.0	0.0	0.0	0.0	0.0	V
3	MISC LD													
	OIL PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0.0	0 0.0	0 0.0	0	0
	rn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	U
1	MISC LD													
	P STEAM PK	0.0	0.0	0.0	0 0.0	0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0	0	•
	<b>γ</b> Λ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
5	MISC LD													
	P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	_
	PK	0.0	0.0	0.0	. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
ó	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
	EQ1161		AIR-	-CLD COND	COMP <	15 TONS								
	ELEC	0	0	0	0	972	4258	7488	4454	838	0	0	0	18,0
	ÞΚ	0.0	0.0	0.0	0.0	60.8	63.2	65.4	63.4	61.0	0.0	0.0	0.0	65
	EQ5200		CONE	DENSER FA	NS									
	ELEC	0	0	0	0	102	393	725	419	88	0	0	0	1,7
	PK	0.0	0.0	0.0	0.0	2.4	4.8	5.8	4.8	3.5	0.0	0.0	0.0	5
	EQ5303		רממה	TROLS										
•	ELEC	0	0	0	0	19	66	60	69	17	0	0	0	2
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0
,	EQ1161		Δ <b>1</b> 0-	-CLD COND	CUMD V	15 TANG								
•	EFEC	0	0	0	CUMP (.	15 TUNS 77	517	923	559	76	0	0	0	2,1
	PΚ	0.0	0.0	0.0	0.0	7.8	8.1	8.4	8.1	7.8	0.0	0.0	0.0	8
	בחבססס		CUNI	מבשפבם בא	не									
•	EQ5200 Elec	0	0	DENSER FA O	0	8	49	90	53	8	0	0	0	2
	PK	0.0	0.0	0.0	0.0	0.2	0.6	0.7	0.6	0.5	0.0	0.0	0.0	. 0

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## EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 REPLACE FLUORESCENT BALLASTS

217		0	0	0	17	63	60	59	17	0	0	0	0	ELEC	
0.3		0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	PK	
										FAN C.V.	ENTRIF. 1	FC C		EQ4003	1
2,918	17	676	676	744	1503	1719	1494	1644	1654	676	778	643	710	ELEC	
7.5		3.4	3.4	3.4	7.5	7.5	7.5	7.5	7.5	3.4	3.4	3.4	3.4	PK	
										AN C.V.	ENTRIF. A	FC CS		EQ4003	2
147		0	0	0	28	32	28	30	30	0	0	0	0	ELEC	
0.1		0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	PK	
										1	LLER FAI	PROPE		EQ4381	4
0		0	0	0	0	0	0	0	0		0	0	0	ELEC	
0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PΚ	
									VATER	ST. HOT ⊭	HASED DIS	PURCI		EQ2102	1
5,105	!	1061	484	122	0	0	0	0	0	171	719	1244	1305	P HOTH20	
6.8		6.8	6.8	6.6	0.0	0.0	0.0	0.0	0.0	6.8	6.8	6.8	6.8	PK	
									P.C.V.	IRC. PUMF	WATER C	HEAT		EQ5020	1
57		13	6	2	0	0	0	0	0	3	8	12	13	ELEC	
0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PK	
5	,	1061 6.8	484 6.8	122 6.6	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0 0.0 0 C.V.	0 0.0 67. HOT # 171 6.8 IRC. PUMF 3	0.0 HASED DIS 719 6.8 WATER C	0 0.0 PURCI 1244 6.8 HEAT 12	0.0 1305 6.8	PK EQ2102 P HOTH20 PK EQ5020 ELEC	

UTILITY PEAK CHECKSUMS - ALTERNATIVE 4

Grand Total

140.9 100.00

	ELECTRIC DEM		U T I L	ITY PEAK	CHEC	KSUMS	
OLITICA	ELECIKIO DEI	IHITU	•				
	ue 140.9 ime of Peak 1	(kW) 5 (hr) 7 (mo	)	•			
Hour 15	Month 7						
	Equipment Code Name		Equipment	Description	Utility Demand (kW)	Of Tot	
Cooling (	Equipment						
1	EQ1161	AIR-CLD COND	COMP <15 TONS		71.4	50.70	
2	EQ1161	AIR-CLD COND	COMP <15 TONS		9.4	6.70	
Sub Tota	1				80.9	57.39	
Sub Tota	l				0.0	0.00	
Air Movi	ng Equipment						
1		SUMMATION OF	FAN ELECTRICAL	DEMAND	7.5	5.30	
2		SUMMATION OF	FAN ELECTRICAL	DEMAND	0.1	0.10	
Sub Total	1				7.6	5.40	

Sub Total	7.6	5.40
Sub Total	0.0	0.00
Miscellaneous		
Lights	52.4	37.21
Base Utilities	0.0	0.00
Misc Equipment	0.0	0.00
Sub Total	52.4	37.21

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 46

Weather File Code: CARLISLE Location: ENERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F)

Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 7:33:34 1/14/94
Dataset Name: CB46B .TM

AIRFLOW - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	1,684	15,553	15,653	19,580	5,611	0	0
2	PTAC	0	1,544	1,544	2,116	572	0	0
3	RAD	0	0	0	0	365	0	0
4	UH	0	0	6,035	0	2,238	0	0
Totals		1,684	17,097	23.232	21.696	8.786	0	0

CAPACITY - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) 1 SZ 45.5 0.0 0.0 45.5 -661,631 0 -71,327 0 0 -661,631 0 0 0 6.0 -84,702 2 PTAC 6.0 0.0 0.0 0 0 0 0 0 0 -84,702 0.0 0.0 0.0 -49,312 3 RAD 0 0 0.0 0 0 -49,312 0 4 UH 0 0.0 0.0 0.0 0.0 -349,1360 0 -349,136 Totals 51.4 0.0 0.0 51.4 -1,144,780 0 -71,327 0 0 -1,144,780

The building peaked at hour 16 month 7 with a capacity of 51.3 tons

ENGINEERING CHECKS - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

------ ENGINEERING CHECKS-------ENGINEERING

1			Percent		Cool	ing		Heat	ing	
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Top	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft
1	Main	SZ	10.83	0.91	342.1	374.4	32.05	0.92	-38.86	17,026
2	Main	PTAC	0.00	1.11	258.8	232.5	51.60	1.11	-61.07	1,387
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-59.41	830
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.61	-35.32	9.886

System 1 Peak SZ - SINGLE ZONE

**********					******	******						
Peaked at Tim Outside Air =			Mo/Hr: D8/WB/HR:		۸			o/Hr: DADB:			Mo/Hr: 13/ 1	
outside Hii -	-/		vo/mo/na.	71/ /4/103.0	U		* :	: סטאנ	71 *		OADB: 4	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Space	Percnt.*	Space Peak	Coil Peak	Percnt
	Se	ns.+Lat.	Sensible			Of Tot		sible	Of Tot *	'		
Envelope Load		(Btuh)	(Btuh)		(Btuh)			Btuh)	(%) *			
Skylite Sol		0	0	(,	0		*	0	0.00 *		(555.7)	
Skylite Con		0	0		0			0	0.00 *			
Roof Cond		0	121,793		121,793			0	0.00 *		-90,278	
Glass Solar		67,392	0		67,392			3,968	24.15 *		•	
Glass Cond		19,075	0		19,075			9,852	6.48 *		•	
Wall Cond		18,084	3,570		21,654			9,556	6.38 *	,	•	
Partition		0	-,		0			0	0.00 *			
Exposed Flo	or	0			0			0	0.00 *		-	
Infiltratio		151,003			151,003			5,238	21.62 *			
Sub Total==		255,553	125,364	•	380,916			9,614	58.64 *	•	·	
Internal Load		230,000	220,00		000,710	07101	*	, 011	*	,	347,000	100.00
Lights		69,574	0		69,574	12.75	* 7	2,814	23.77 *	0		0.00
People		32,175	•		32,175			5,332	5.01 *		-	
Misc		0	0	0	02,173			0	0.00 *			
Sub   Total ==	>	101,749	0	=	101,749			3,146	28.78 *		_	
Ceiling Load	•	42,025	-42,025	•	0			3,561	12.59 *		_	
Outside Air		0	72,023	0	66,046			0,501	0.00 *	•		
Sup. Fan Heat		V	V	v	12,166			V	0.00 *		0	
Ret. Fan Heat			0		12,100				0.00 *		. 0	
Duct Heat Pku			0		٨	0.00			0.00 *		C	
OV/UNDR Sizin		0	v		0			0	0.00 *	0	•	
Exhaust Heat	9	V	-15,241	0	-15,241			V	0.00 *	V	0	
Terminal Bypa	55		15,241	0	13,241				0.00 *		0	
Torminal bypa	-		V			0.00	*		*		·	0.00
Grand Total==	>	399 327	68,097	0	545 636	100.00	•	5,321	-	-467,422	-547,303	100.00
!	•	077,027	00,077	. ·	343,000	100.00	. 500	,,,,,,,	100.00	401,422	-347,303	100.00
'				LING COIL SE	FLECTION						AREAS	
: To	tal Ca	apacity	Sens Cap.			ng DB/WB/I			B/WB/HR	Gross Total		sf) (%)
. (То		(Mbh)	(Mbh)		Deg F De			_	Grains		,026	31) (1)
	5.5	545.6	405.6	15,553	83.7 6			55.5		Part	0	
. •	0.0	0.0	0.0	0		0.0 0		0.0		ExFlr	0	
1 7	0.0	0.0	0.0	0		0.0 . 0.		0.0			,846	0 0
	5.5	545.6	• • •	•	***	•	•		• • • • • • • • • • • • • • • • • • • •			,776 30
		0,010								,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	, , , , 0
HE	ATING	COIL SELE	ECTION		AI	RELOWS (c:	m)		ENGINEERING	CHECKS	TEMPERATUR	FS (F)
	acity				Type	Cooling	Heating		g % OA	10.8	Type Cl	
	Mbh)	(cfr		-	Vent	1,684	(		g Cfm/Sqft			.9 95.4
,	661.6		-	95.4			3,92		g Cfm/Ton			.8 58.5
_	0.0		0 0.0		Supply	15,553	15,653		g Sqft/Ton			.0 57.8
	-71.3			56.2	Mincfm	0	15,050		g 8tuh/Sqft			.7 57.8
Reheat	0.0		0 0.0	0.0	Return	15,553	15,653		. People			.0 68.0
Humidif	0.0		0 0.0	0.0	Exhaust	1,684	15,050		g % OA			.2 0.2
Opt Vent	0.0		0 0.0	0.0	Rm Exh	1,004	(		g Cfm/SqFt			.1 0.1
•	661.6		o v.v	V.V	Auxil	0			g Btuh/SqFt			.4 0.4
						٧	`	. 116	2 Dodnijodi t	00.00	1.1.11200 0	. T V. T

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

	Time ==		Mo/Hr:		^		*		/Hr:	•		Mo/Hr:	•	
outside A	1r ==>	UH	DB/WB/HR:	91/ /4/105.	U		*	U	ADB:	91 *		OAD8:	4	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	S	pace	Percnt *	Space Pe	ak Coi	l Peak	Percnt
	S	ens.+Lat.	Sensible	Latent	Total	Of Tot	*	Sens	ible	Of Tot *	Space Se	ns To	t Sens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	*	(B:	tuh)	(%) *	(Btu	ıh)	(Btuh)	(%)
Skylite	Solr	0	0		0	0.00	*		0	0.00 *		0	0	0.00
Skylite	Cond	0	0		0	0.00	*		0	0.00 *		0	0	0.00
Roof Co	nd	0	21,144		21,144	29.54	*		0	0.00 *		0 -	17,552	20.64
Glass S	olar	11,232	0		11,232	15.69	*	10	,944	28.55 *		0	0	0.00
Glass C	ond	3,009	0		3,009	4.20	*	3	,180	8.30 *	-15,4	43 -	15,443	18.16
Wall Co	nd	2,731	531		3,263	4.56	*	2	,977	7.77 *	-9,2	54 -	12,204	14.35
Partiti	on	0			0	0.00	*		0	0.00 *		0	0	0.00
Exposed	Floor	0			0	0.00	*		0	0.00 *		0	0	0.00
Infiltr.	ation	24,717			24,717	34.53	*	9.	865	25.74 *	-39,8	53 -	39,853	46.86
Sub Tot	al==>	41,690	21,675		63,365	88.53	*	26	,967	70.35 *			85,052	100.00
Internal	Loads						*			*			•	
Lights		5,429	0		5,429	7.59	*	5.	,572	14.53 *		0	0	0.00
People		2,558			2,558	3.57	*	1	,167	3.04 *		0	0	0.00
Misc		0	0	0	0	0.00	*		0	0.00 *		0	0	0.00
Sub! Tot:	al==>	7,988	0	0	7,988	11.16	*	6,	,738	17.58 *		0	0	0.00
Ceiling L	oad	4,174	-4,174		0	0.00	*	4.	,628	12.07 *	-4,2	43	0	0.00
Outside A	ir	0	0	0	0	0.00	*		0	0.00 *		0	0	0.00
Sup. Fan	Heat				220	0.31	*			0.00 *			0	0.00
Ret. Fan	Heat		0		. 0	0.00	*			0.00 *			0	0.00
Duct Heat	Pkup		0		0	0.00	*			0.00 *			0	0.00
OV/UNDR S	izing	0			0	0.00	*		0	0.00 *		0	0	0.00
Exhaust H	eat		0	0	0	0.00	*			0.00 *			0	0.00
Terminal (	Bypass		0	0	0	0.00	*			0.00 *			0	0.00
					•		*			*				
Grand Tota	al==>	53,852	17,500		71,572	100.00	*	38,	, 333	100.00 *			35,052	100.00
			C00I											
1			Sens Cap.						_	B/WB/HR			lass (si	f) (%)
	(Tons)	(Mbh)			Deg F Deg			_		Grains		1,387		
Main Clg	6.0	71.6	55.1	1,544	84.2 65		6.5	52.1			Part	0		
Aux Clg	0.0	0.0	0.0	0			0.0	0.0	0.0		ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	).0 (	0.0	0.0	0.0	0.0	Roof	1,387		0 0
Totals	6.0	71.6									Wall	867	2	2 <b>88 3</b> 3
			ECTION		AIA					ENGINEERING				(F)
			irfl Ent			Cooling		leating		g % OA	0.0	Type		
	(Mbh)			Deg F	Vent	0		0		g Cfm/Sqft		SADB		109.0
Main Htg	-84.7	•		109.0	Infil	572		572		g Cfm/Ton		Plenum		
Aux Htg	0.0		0.0	0.0		1,544		1,544		g Sqft/Ton	232.55	Return		
Preheat	-0.0			52.0	Mincfm	0		0		g Btuh/Sqft		Ret/OA		
Reheat	0.0		0.0	0.0	Return	1,544		1,544		. People	5	Runarn		
Humidif	0.0		0.0	0.0	Exhaust	0		0		g % DA	0.0	Fn Mtr		
Opt Vent	0.0		0.0	0.0	Rm Exh	0		0		g Cfm/SqFt		Fn Bld		0.0
Total	-84.7	7			Auxil	0		0	11.4	g Btuh/SqFt	/ 1 A T	Fn Fri	ct 0.1	0.0

System 3 Block RAD - RADIATION

	t Time ==:		Mo/Hr:				*			/ 0 *		Mo/Hr: 1	-	
Outside /	A1r ==>	0A	DB/WB/HR:	0/ 0/ 0.	0		*	04	AD8:	0 *		OADB:	4	
		Space	Ret. Air	Ret. Air	Net	t Percn	t *	Sį	oace	Percnt *	Space Pea	ak Coil	Peak	Percni
	Se	ens.+Lat.	Sensible	Latent	Total	l Of Tot	t *	Sensi	ible	Of Tot *	Space Ser	ns Tot	Sens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	) *	(B1	tuh)	(%) *	(Btul	h) (B	tuh)	(%)
Skylite	e Solr	0	0		(	0.00	) *		0	0.00 *		0	Ó	0.00
Skylite	e Cond	0	0		(	0.00	) *		0	0.00 *		0	0	0.00
Roof Co	ond	0	0		(	0.00	) *		0	0.00 *		0 -6	,714	13.6
Glass S	Solar	0	0		(	0.00	) *		0	0.00 *		0	0	0.00
Glass (	Cond	0	0		(	0.00	) *		0	0.00 *	-10,29	95 -10	,295	20.8
Wall Co	ond	0	0		(	0.00	) *		0	0.00 *	-5,7	11 -6	,907	14.0
Partiti	ion	0			(	0.00	) *		0	0.00 *	·	0	0	0.0
Expose	d Floor	0			(	0.00	) *		0	0.00 *		0	0	0.0
Infilt		0			(				0	0.00 *	-25,39	96 -25	,396	51.5
Sub To		0	0	•	(		) *		0	0.00 *			,312	100.0
Internal			_		·		*			*	,		,	
Lights		0	0		(	0.00	) *		0	0.00 *		0	0	0.0
People		0			(				0	0.00 *		0	0	0.0
Misc		0	0	0	(				0	0.00 *		0	0	0.0
Sub! Toi	tal==>	0	0	0	(				0	0.00 *		0	0	0.0
Ceiling H		0	0		(				0	0.00 *	-7,86	05	0	0.0
Outside A		0	0	0	(				0	0.00 *	.,-	0	0	0.0
Sup. Fan					(					0.00 *		•	0	0.0
Ret. Fan			0		. (					0.00 *			0	0.00
Duct Heat			0		(					0.00 *			0	0.00
OV/UNDR S		0			(				0	0.00 *		0	0	0.0
Exhaust 1	-	-	0	0	(				-	0.00 *		·	0	0.0
Terminal			0	0	(					0.00 *			0	0.0
	••		_		•		*			*			•	
Grand Tot	tal==>	0	0	0	(	0.00	* (		0	0.00 *	-49,20	08 -49	,312	100.0
				LING COIL S	E1 COTTON							AREAS-		
1	Total (	apacity	Sens Cap.	Coil Airfl		ing DB/WE				/WB/HR	Gross Tota		ss (sf	(%)
,	(Tons)	(Mbh)	(Mbh)			eg F Gra				Grains	Floor	830	33 (3)	, (*,
ain Clg	0.0	0.0	0.0	(31,111)	-	0.0	0.0	0.0	0.0	0.0	Part	0		
ux Clg	0.0	0.0	0.0	0		0.0	0.0	0.0	0.0	0.0	ExFlr	0		
pt Vent	0.0	0.0	0.0	0			0.0	0.0	0.0	0.0	Roof	830		0 (
otals	0.0	0.0	0.0	v	0.0	•••	•••	•••			Wall	553	1	92 3
	HFATING	COTL SEL	FCTION		AI	TRELOWS I	(cfm)-		~~F	NGINEERING	CHECKS	TEMPER	ATIIRES	(F)
	Capacity				Type	Cooling		leating		% 0A	0.0	Type	Clg	
	(Mbh)				Vent		)	0		Cfm/Sqft		SADB	0.0	_
ain Htg	-49.3		0.0	-	Infil		)	365		Cfm/Ton		Plenum	0.0	
ux Htg	0.0		0 0.0		Supply		)	0	-	Sqft/Ton	0.00	Return	0.0	
reheat	0.0		0 0.0		Mincfm		)	0		Btuh/Sqft		Ret/OA	0.0	
eheat	0.0		0 0.0		Return		)	ŏ		People	0.00	Runarnd	0.0	
onear	0.0		0 0.0		Exhaust		)	0		% OA	0.0	Fn MtrTD		
lumidif	11 1													
umidif pt Vent	0.0		0 0.0		Rm Exh		)	0		Cfm/SqFt		Fn BldTD		

System 4 Block UH - UNIT HEATERS

eaked at			Mo/Hr:				•		/Hr:	0/0 *		Mo/Hr: 1	3/1	
Outside Ai	(r ==>	OAI	OB/WB/HR:	0/ 0/ 0.	0		*	0	ADB:	0 *		OAD8:	4	
		Space	Ret. Air	Ret. Air	N	et Pei	rcnt *	S	pace	Percnt *	Space Pe	ak Coil	Deak	Percn
	Se	ns.+Lat.	Sensible				Tot *		•	Of Tot *				Of To
invelope L		(Btuh)	(Btuh)		(Btu		(%) *			(%) *	•			(%
Skylite		Ó	0	, ,	(		).00 *	•	0	0.00 *	•	0	0	0.0
Skylite		0	0				).00 *		Ō	0.00 *		0	0	0.0
Roof Con		0	0				.00 *		0	0.00 *		0 -74	,057	21.
Glass Sc		0	0				.00 *		0	0.00 *			0	0.
Glass Co	nd	0	0				.00 *		0	0.00 *			,355	21.
Wall Cor		0	0				).00 *		0	0.00 *			,407	11.
Partitio		0					.00 *		Ō	0.00 *			,	0.
Exposed		0					).00 *		0	0.00 *		0	0	0.
Infiltra		0					.00 *		0	0.00 *		-	-	45.
Sub Tota		0	0	•			).00 *		0	0.00 *				100.
nternal L						•	*		•	*			,	- • • •
Lights		0	0			0 (	).00 *		0	0.00 *		0	0	0.
People		0					.00 *		0	0.00 *		0	0	0.
Misc		0	0	0		0 (	.00 *		0	0.00 *		0	0	0.
Sub!Tota	1==>	0	0	0		0 0	.00 *		0	0.00 *		0	0	0.
eiling Lo	ad	0	0			0 0	.00 *		0	0.00 *	-84,8	30	0	0.
utside Ai	r	0	0	0		0 0	* 00.0		0	0.00 *		0	0	0.
up. Fan H	leat					0 0	* 00.0			0.00 *			0	0.
et. Fan H	leat		0		•	0 0	.00 *			0.00 *			0	0.
uct Heat	Pkup		0			0 0	.00 *			0.00 *			0	0.
V/UNDR Si	zing	0				0 0	* 00.0		0	0.00 *		0	0	0.
xhaust He	at		0	0		0 0	* 00.0			0.00 *			0	0.
erminal B	ypass		0	0		0 0	.00 *			0.00 *			0	0.
					•		*			*				
rand   Tota 		0	0				.00 *		0	0.00 *	~345,0	28 -341	,713	100.
			C001											
			Sens Cap.								Gross Tota		55 (51	f) (%
			(Mbh)								Floor	9,886		
x Clg	0.0	0.0	0.0		0.0	0.0	0.0			0.0	Part			
x cig t Vent	0.0	0.0	0.0	0	0.0	0.0		0.0 0.0	0.0 0.0		Exflr Roof	0 005		٥
tals	0.0	0.0	0.0	V	0.0	0.0	0.0	0.0	۷.۷	0.0	Wall	8,985 3,392	1,3	0 368
	-HEATING	COIL SELE	CTION			AIRFLOW	S (cfm)	)		ENGINEERING	CHECKS	TEMPER	ATURES	S (F)-
	Capacity				Type	Cool		Heating		g % OA	0.0	Туре	Clg	
	(Mbh)	(cfm			Vent		Ö	0		g Cfm/Sqft	0.00	SADB	0.0	
in Htg	-349.1			120.5	Infil		0	2,238		g Cfm/Ton	0.00	Plenum	0.0	
( Htg	0.0		0.0	0.0	Supply		0	6,035		g Sqft/Ton	0.00	Return	0.0	
eheat	0.0		0.0	0.0	Mincfm		0	0		g Btuh/Sqft	0.00	Ret/OA	0.0	
neat	0.0		0.0	0.0	Return		0	6,035		. People	0	Runarnd	0.0	
nidif	0.0		0.0	0.0	Exhaust		0	0		g % OA	0.0	Fn MtrTD	0.0	
t Vent	0.0		0.0	0.0	Rm Exh		0	0		g Cfm/SqFt	0.61	Fn BldTD	0.0	
tal	-349.1				Auxil		0	0		g Btuh/SqFt	-35.32	Fn Frict	0.0	

BUILDING U-VALUES - ALTERNATIVE 1 REPLACE FLUORESCENT FIXTURES

----- BUILDING U-VALUES------

				Room	Room							
					(Btu	/hr/sqf	t/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
2	LIQUOR STORE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	49.2	10.88
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	75.9	17.16
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
8	2ND FL TOILETS	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	78.1	17.65
3	LIQUOR STORAGE	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	47.0	10.75
Buildin	g	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	50.5	11.33

BUILDING AREAS - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

BUILDING AREAS

				Floor	Total		Exposed						
			er of			Partition	Floor	Skylight		Net Roof	Window	Win	Net Wall
Room		Dupli		Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	1ST FL OFFICES	1	1	8,053	8,053	0	0	0	0	0	624	24	1,926
Zone	<pre>1 Total/Ave.</pre>				8,053	0	0	0	0	0	624	24	1,926
2	LIQUOR STORE	1	1	1,127	1,127	0	0	0	0	0	0	0	739
Zone	<pre>2 Total/Ave.</pre>				1,127	0	0	0	0	0	0	0	739
4	LIBRARY	1	1	3.692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
System	<pre>1 Total/Ave.</pre>				17,026	0	0	0	0	7,846	1,776	30	4,174
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone :	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
System	<pre>2 Total/Ave.</pre>				1,387	0	0	0	0	1,387	288	33	579
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	. 96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
8	2ND FL TOILETS	1	1	582	582	0	0	0	0	582	96	34	184
Zone	8 Total/Ave.				582	0	0	0	0	582	96	34	184
System	3 Total/Ave.				830	0	0	0	0	830	192	35	360
3	LIQUOR STORAGE	1	1	901	901	0	0	0	0	0	24	18	112
Zone	3 Total/Ave.			•	901	0	0	0	0	0	24	18	112
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
6	2ND FL OFFICES	1	1	1,139	. 1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
System	4 Total/Ave.				9,886	0	0	0	0	8,985	1,368	40	2,023
Buildin	g				29,129	. 0	0	0	0	19,048	3,624	34	7,137

ASHRAE 90 ANALYSIS - ALTERNATIVE 1 REPLACE FLUORESCENT FIXTURES

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.232 (Btu/Hr/Sq Ft/F) Overall Wall U-Value = 0.500 (Btu/Hr/Sq Ft/F)Overall Building U-Value = 0.329 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 18.58 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 33.33 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1 REPLACE FLUORESCENT FIXTURES

## System Totals

Percent Cooling Load		Heating Load			Cooling		<del>-</del>					
Design Load	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	2.6	12	92	-60,805	24	593	1,161.6	0	0	0.0	0	0
5 - 10	5.1	3	22	-121,611	28	671	2,323.2	0	0	0.0	0	0
10 - 15	7.7	9	67	-182,416	19	473	3,484.9	0	0	0.0	0	0
15 - 20	10.3	0	0	-243,221	2	58	4,646.5	0	0	0.0	0	0
20 - 25	12.9	14	105	-304.027	2	40	5,808.1	0	0	0.0	0	0
25 - 30	15.4	3	23	-364,832	3	64	6,969.7	59	3,638	0.0	0	0
30 - <sub>1</sub> 35	18.0	7	53	-425,637	1	32	8,131.3	0	0	0.0	0	0
35 - 40	20.6	5	41	-486,443	0	3	9,292.9	0	0	0.0	0	0
40 - 45	23.1	4	32	-547,248	1	21	10,454.6	0	0	0.0	0	0
45 - 50	25.7	11	81	-608,054	1	30	11,616.2	0	0	0.0	0	0
50 - '55	28.3	9	67	-668,859	11	279	12,777.8	0	0	0.0	0	0
55 - 60	30.9	5	42	-729,664	7	166	13,939.4	24	1,450	0.0	0	0
60 - 65	33.4	2	18	-790,469	0	0	15,101.0	0	0	0.0	0	0
65 - :70	36.0	5	40	-851,275	0	0	16,262.6	0	0	0.0	. 0	0
70 - 75	38.6	6	45	-912,080	0	0	17,424.3	17	1,070	0.0	0	0
75 - 80	41.1	2	15	-972,886	0	0	18,585.9	0	0	0.0	0	0
80 - 85	43.7	1	5	-1.033,691	0	0	19,747.5	0	0	0.0	0	0
85 <b>-</b> <sup>1</sup> 90	46.3	3	20	-1,094,496	0	0	20,909.1	0	0	0.0	0	0
90 - 95	48.9	0	0	-1,155,302	0	0	22,070.7	0	0	0.0	0	0
95 - 100	51.4	0	0	-1,216,107	0	0	23,232.3	0	0	0.0	0	0
Hours Off	0.0	0	7,992	0	0	6,330	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1 REPLACE FLUORESCENT FIXTURES

************					B U I	LDI	N G	TEM	PER	ATU	RE P	ROF	F I L E S
Temperature										Zone N	umber		
Range (F)	1	2	4	5	6	7	7	8	3	4	5	Ć	6
Max. Temp.	83.4	81.1	89.8	88.9	87.2	87.5	103.0	102.0	118.6	106.7	105.5	102.	1
Mo./Hr.	7 20	7 22	7 20	7 20	7 19	7 20	8 20	8 20	8 19	7 21	7 20	7 18	8
Day Type	4	4	4	4	4	4	1	1	2	1	1	7	2
									Mar	mber o	f Wour	e	
Above 100	0	0	0				325		2,808			219	0
95 - 100	0	•	-	-	-					1,024			
90 - 95	0							1,060					
<b>85 -</b> 90	0	_	-										
80, - 85	585	-	1,414			1,045							
75 - 80			1,812										
70 - 75		1,045							1,152				
65; - 70		2,130							,	1,744			
60 - 65		1,315					-	1,119		1,039		1.094	
55 - 60	704	•				•				764		812	
50 - 55	380	344						1,054		1,005			
Below 50	644		2,161					0		•	,		
Min. Temp.	7.6 R	7 Q Q	34.2	71 0	מ כז	74 N	54 0	5/ 0	54 0	54.9	5/ 0	54 (	0
Mo./Hr.		2 7										1 9	_
Day Type	5					- '					- '		2
vay Type	J	J	4	4	J	J		4	J	4	4	4	<u>_</u>

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1 REPLACE FLUORESCENT FIXTURES

------ MONTHLY ENERGY CONSUMPTION-----

	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak	On Peak	On Peak	On Peak
Month	(kWh)	(kW)	(Therm)	(Thrm/hr)
Jan	9,089	47	1,335	7
Feb	8,223	47	1,271	7
March	9,948	47	756	7
April	8,646	47	192	7
May	11,302	116	0	0
June	15,347	126	0	0
July	18,390	129	0	0
Aug	16,055	126	. 0	0
Sept	10,281	122	0	0
Oct	9,510	47	135	7
Nov	8,649	47	509	7
Dec	8,656	47	1,092	7
Total	134,095	129	5,291	7

Building Energy Consumption = 33,876 (Btu/Sq Ft/Year) Floor Area = 29,129 (Sq Ft)
Source Energy Consumption = 71,359 (Btu/Sq Ft/Year)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1 REPLACE FLUORESCENT FIXTURES

------ EQUIPMENT ENERGY CONSUMPTION------

2.5								. •						
	Equip - Code	Jan	Feb	Mar	Apr	May	thly Cons June	sumption July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS ELEC PK	8396 43.7	7596 43.7	9195 <b>43.</b> 7	7996 <b>43</b> .7	8796 <b>43.</b> 7	8796 43.7	7996 43.7	9195 43.7	7996 <b>43.</b> 7	8796 43.7	7996 <b>43</b> .7	7996 43.7	100,748 43.7
1	MISC LD ELEC PK	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
2	MISC LD GAS PK	0.0	0	0.0	0.0	0.0	0	0	0	0.0	0.0	0.0	0.0	0
3	MISC LD OIL PK	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0.0	0.0	0.0	0.0	0
4	MISC LD P STEAM PK	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD P HOTH2O PK	0.0	0.0	0.0	0 0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0
6	MISC LD P CHILL PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0
1	EQ1161 ELEC PK	0.0	AIR- 0 0.0	CLD COND 0 0.0	COMP <1 0 0.0	5 TONS 695 58.6	3886 60.9	7111 63.0	4049 61.1	624 58.8	0.0	0.0	0.0	16,365 63.0
1	EQ5200 Elec PK	0	COND 0 0.0	ENSER FA 0 0.0	NS 0 0.0	73 2.4	. 361 4.6	688 5.6	383 4.6	66 3.4	0.0	0.0	0 0.0	1,571 5.6
1	EQ5303 ELEC PK	0.0	CONT 0 0.0	ROLS 0 0.0	0.0	19 0.3	66 0.3	60 0.3	69 0.3	17 0.3	0.0	0.0	0	230 0.3
2	EQ1161 ELEC PK	0.0	AIR- 0 0.0	CLD COND 0 0.0	COMP <1 0 0.0	5 TONS 53 7.2	490 8.0	897 8.3	528 8.0	57 7.7	0	0.0	0 0.0	2,025 8.3
2	EQ5200 ELEC PK	0.0	COND 0 0.0	ENSER FA O O.O	NS 0 0.0	6 0.2	46 0.6	87 0.7	51 0.6	6 0.5	0.0	0.0	0 0.0	195 0.7
2	EQ5303		CONT	ROLS										

	ne Air Condit Trane Custom	-		. Networ	k									V 600 PAGE 14
	IPMENT ENERGY LACE FLUORESC			TERNATI	VE 1									
	ELEC PK	0.0	0	0.0	0.0	11 0.3	59 0.3	60 0.3	63 0.3	16 0.3	0.0	0.0	0	209 0.3
		V. V	٧,٠	0.0	٧.٠	0.0	٧.٠	0.0	٧.٥	0.0	0.0	V. V	٧.٧	0.0
1	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	680	615	744	647	1621	1614	1465	1685	1474	712	647	647	12,551
	PΚ	3.2	3.2	3.2	3.2	7.4	7.4	7.3	7.4	7.4	3.2	3.2	3.2	7.4
2	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	0	0	0	0	29	29	26	30	26	0	0	0	141
	PK	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
4	EQ4381		PROP	ELLER F	AN									
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2102		PURC	HASED D	IST. HOT	WATER								
	P HOTH20	1335	1271	756	192	0	0	0	0	0	135	509	1092	5,291
	þΚ	6.8	6.8	6.8	6.8	0.0	0.0	0.0	0.0	0.0	6.6	6.8	6.8	6.8
1	EQ5020		HEAT	WATER	CIRC. PUM	P C.V.								
	ELEC	13	12	9	3	0	0	0	0	0	2	6	13	58
	bΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	PK EQ5020 ELEC	6.8	HEAT 12	6.8 WATER 9	6.8 CIRC. PUM 3	0.0 P C.V.	0.0	0.0	0.0	0.0	6.6	6.8	6.8	6

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UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

Utility	ELECTRIC	DEMAND

Peak Value 129.3 (kW) Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Hour 15 Month 7				
Eqp. Ref. Equipment Num. Code Name	Equipment Description	Utility Demand (kW)	Percnt Of Tot (%)	
Cooling Equipment				
1 EQ1161 2 EQ1161	AIR-CLD COND COMP <15 TONS AIR-CLD COND COMP <15 TONS	68.9 9.3	53.26 7.18	
Sub Total		78.1	60.44	
Sub Total		0.0	0.00	
Air Moving Equipment				
1 2	SUMMATION OF FAN ELECTRICAL DEMAND SUMMATION OF FAN ELECTRICAL DEMAND	7.3 0.1	5.66 0.10	
Sub Total		7.5	5.77	
Sub Total		0.0	0.00	
Miscellaneous	·			
Lights Base Utilities Misc Equipment Sub Total		43.7 0.0 0.0 43.7	33.80 0.00 0.00 33.80	
Grand Total		129.3	100.00	

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Trane Air Conditioning Economics
By: Trane Customer Direct Service Network
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 46

Time/Date Program was Run:

Dataset Name:

```
Weather File Code:
                                CARLISLE
 Location:
                                ENERGY SAVINGS OPPORTUNITY STUDY
 Latitude:
                               40.2 (dea)
: Longitude:
                               77.2 (deg)
Time Zone:
                                 5
 Elevation:
                                 475 (ft)
 Barometric Pressure:
                                 29.2 (in. Hg)
 Summer Clearness Number:
                               1.00
 Winter Clearness Number:
                                1.00
 Summer Design Dry Bulb:
                                 92 (F)
 Summer Design Wet Bulb:
                                 72 (F)
 Winter Design Dry Bulb:
                                  4 (F)
 Summer Ground Relectance:
                                 0.20
 Winter Ground Relectance:
                                 0.20
 Air Density:
                               0.0742 (Lbm/cuft)
 Air Specific Heat:
                               0.2444 (Btu/lbm/F)
 Density-Specific Heat Prod:
                              1.0882 (Btu-min./hr/cuft/F)
 Latent Heat Factor:
                              4,790.2 (8tu-min./hr/cuft)
 Enthalpy Factor:
                              4.4519 (Lb-min./hr/cuft)
 Design Simulation Period: May
                                  To September
 System Simulation Period: January To December
 Cooling Load Methodology:
                             CLTD/CLF (Transfer Function Method)
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8: 5:52 1/14/94

CB46B .TM

AIRFLOW - ALTERNATIVE 2 COMBINED ECOS

				Main			Auxil.	Room
		Outside	Cooling	Heating	Return	Exhaust	Supply	Exhaust
System	System	Airflow	Airflow	Airflow	Airflow	Airflow	Airflow	Airflow
Number	Type	(Cfm)						
1	SZ	1,493	14,281	14,381	17,415	4,528	0	0
2	PTAC	0	1,326	1,326	1,769	442	0	0
3	RAD	0	0	0	0	282	0	0
4	UH	0	0	4,192	0	1,730	0	0
Totals		1,493	15,607	19,899	19,184	6,981	0	0

CAPACITY - ALTERNATIVE 2 COMBINED ECOS

Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) 1 SZ 32.4 0.0 0.0 32.4 -372,971 0 0 0 0 -372,971 3.7 -51,958 0.0 -33,113 0 2 PTAC 3.7 0.0 0.0 0 0 0 0 0 0 0 -51,958 0 3 RAD 0.0 0.0 0 0 0 0.0 -33,113 4 UH 0.0 0.0 0.0 -223,775 0 0 0 0 -223,775 Totals 36.1 0.0 0.0 36.1 -681,816 0 -681,816

The building peaked at hour 16 month 7 with a capacity of 35.4 tons

ENGINEERING CHECKS - ALTERNATIVE 2 COMBINED ECOS

•			Percent		Cool:	ing		Heat	ing	
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq ft	Floor Area Sq Ft
1	Main	S <i>I</i>	10.46	0.84	440.5	525.2	22.85	0.84	-21.91	17,026
2	Main	PTAC	0.00	0.96	357.1	373.3	32.14	0.96	-37.46	1,387
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-39.90	830
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.42	-22.64	9.886

System 1 Peak SZ - SINGLE ZONE

Peaked at Time									.,		,		
Outside Air ==	· > U	אטט/אט/אג:	91/ /4/105.	U		*	U	AD8:	91 *		OADB:	4	
	Space	Ret. Air	Ret. Air	Net	Percnt	*	S	pace	Percnt *	Space Pe	ak Coil	Peak	Percnt
	Sens.+Lat.	Sensible	Latent	Total	Of Tot	*	Sens			Space Se			Of Tot
Envelope Loads	s (Btuh)	(Btuh)	(Btuh)	(Btuh)			(B	tuh)	(%) *	(Bti	ih) (B	tuh)	(%)
Skylite Solr	. 0	0		0	0.00	*		0	0.00 *		0	0	0.00
Skylite Cond	0 t	0		0	0.00	*		0	0.00 *		0	0	0.00
Roof Cond	0	23.745		23,745	6.10	*		0	0.00 *	·	0 -19	,416	5.69
Glass Solar	70,848	0		70,848	18.21	*	73	,968	30.44 *		0	0	0.00
	19,448			19,448	5.00	*	19		8.17 *	-95,2	33 -95	, 233	27.90
Wall Cond	3,242	1,044		4,287	1.10	*	3	,301	1.36 *	-11,4	70 -15	,342	4.49
Partition	0			0	0.00	*			0.00 *		0	0	0.00
Exposed Floo	or 0			0	0.00	*		0 0	0.00 *		0	0	0.00
Infiltration				106,222	27.31	*	51	, 389	21.15 *	-211,3	40 -211	,340	61.92
Sub Total==>	199,760	24,789		224,549	57.72	*		,510			43 -341		
Internal Loads						*			*				
Lights	70,391	0		70,391	18.10	*	72	,568	29.86 *		0	0	0.00
People	32,391	0		32,391		*	15	,271	6.28 *		0	0	0.00
Misc	0	0	0	0	0.00	*		0	0.00 *		0	0	0.00
	102,782		_	102,782	26.42	*	87.	, 839	36.15 *		0	0	0.00
Ceiling Load				0		*	6	,644	2.73 *	-6,2	12	0	0.00
Outside Air	0	0	0	53,222	13.68	*		0	0.00 *		0	0	0.00
Sup. Fan Heat				11,171	2.87	*			0.00 *			0	0.00
Ret. Fan Heat		0		0	0.00	*			0.00 *			0	0.00
Duct Heat Pkup		0		0	0.00	*			0.00 *			0	0.00
OV/UNDR Sizing				0				0	0.00 *		0	0	0.00
Exhaust Heat				-2,720					0.00 *			0	0.00
Terminal Bypas	SS	0	0	. 0	0.00				0.00 *			0	0.00
ا ا	7.0 7.0	4.5.0.0				*			*				
Grand Total==>	310,762	13,849	. 0	389,004	100.00	*	242.	,993	100.00 *	-324,2	55 -341	,331	100.00
											AREAS-		
	al Capacity											ss (sf	(%)
	(Mbh)									Floor			
fain Clg 32										Part	•		
i -	0.0	0.0	0			0.0	0.0	0.0		ExFlr	0		
opt Vent 0		0.0	0	0.0	0.0	.0	0.0	0.0	0.0	Roof	7,846		0 0
Totals 32	389.0									₩all	5,950	1,7	76 30
	TING COIL SEL			AI					-ENGINEERING		TEMPER		
	city Coil A			Type	Cooling	He	eating		lg % OA	10.5	Type	Clg	Htg
	bh) (cf		Deg F	Vent	1,493		0		lg Cfm/Sqft	0.84	SADB	59.4	
-		381 64.9	88.7	Infil	3,035		3,035		lg Cfm/Ton	440.54	Plenum	76.5	
Yux Htg	0.0	0 0.0	0.0	Supply	14,281		14,381		g Sqft/Ton	525.22	Return	76.6	
	-0.0 14,		58.6	Mincfm	0		0		lg Btuh/Sqft		Ret/OA	78.0	
Reheat	0.0	0 0.0	0.0	Return	14,281		14,381		). People	61	Runarnd	75.0	
	0.0	0 0.0	0.0	Exhaust	1,493		0		:g % OA	0.0	Fn MtrTD	0.2	
opt Vent	0.0	0 0.0	0.0	Rm Exh	0		0		g Cfm/SqFt		Fn BldTD	0.1	
「otal −3	73.0			Auxil	0		0	иŧ	ig Btuh/SqFt	-21 91	Fn Frict	0.4	0.4

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

				PEAK ****	*******	******								******
Outside	t Time ==> Air ==>		Mo/Hr: DB/WB/HR:	7/14 91/ 74/105.	0		*		/Hr: ADB:	91 *		Mo/Hr: OAD8:	13/ 1	
		Space	Ret. Air	Ret. Air	Net	Percn	* t *	S	pace	* * Percnt		eak Coil	Peak	Percnt
	Se	ns.+Lat.	Sensible	Latent	Total	Of To	t *	Sens	ible	Of Tot *	Space Se	ens Tot	Sens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%	) *	(B	tuh)	(%) *	(Bti	ιh) (Ι	Btuh)	(%)
Skylit	e Solr	0	0		0	0.0	0 *		0	0.00 *		0	0	0.00
Skylit	e Cond	0	0		0	0.0	0 *		0	0.00 *		0	0	0.00
Roof Co		0	3,458		3,458	7.7	6 *		0	0.00 *		0	3,527	6.80
Glass		11,232	0		11,232	25.1	9 *	11	,520	38.44 *		0	0	0.00
Glass		3,009	0		3,009	6.7	5 *	3	,056	10.20 *	-15,4	143 -1	5,443	29.76
Wall C		462	157		619	1.3	9 *		469	1.57 *	-1,5	663 -	2,128	4.10
Partit:	ion	0			0	0.0	0 *		0	0.00 *		0	0	0.00
Expose	d Floor	0			0	0.0	0 *		0	0.00 *		0	0	0.00
Infilt	ration	18,086			18,086	40.5	7 *	7	,458	24.89 *	-30,7	195 -30	795	59.34
Sub To	tal==>	32,789	3,615		36,404	81.6	6 *	22	,503	75.09 *	-47,8	301 -5.	1,893	100.00
Internal	Loads						*			*				
Lights		5,429	0		5,429	12.1	8 *	5	, 455	18.20 *		0	0	0.00
People		2,558			2,558	5.7	4 *	1	,132	3.78 *		0	0	0.00
Misc		0	0	0	0	0.0	0 *		0	0.00 *		0	0	0.00
Sub! To:	tal::>	7,988	0	0	7,988	17.9	2 *	6	,587	21.98 *		0	0	0.00
Ceiling (	Load	796	-796		0	0.0	0 *		879	2.93 *	-9	55	0	0.00
Outside #	Air	0	0	0	0	0.0	0 *		0	0.00 *		0	0	0.00
Sup. Fan	Heat				189	0.4	2 *			0.00 *			0	0.00
Ret. Fan	Heat		0		. 0	0.0	0 *			0.00 *			0	0.00
Duct Hear	t Pkup		0		0	0.0	0 *			0.00 *			0	0.00
OV/UNDR S	Sizing	0			0	0.0	0 *		0	0.00 *		0	0	0.00
Exhaust 1	Heat		0	0	0	0.0	0 *			0.00 *			0	0.00
Terminal	Bypass		0	0	0	0.0	0 *			0.00 *			0	0.00
1							*			*				
Grand To	tal==>	41,573	2,819	. 0	44,581	100.0	0 *	29	,969	100.00 *	-48,7	<b>'</b> 57 <b>-</b> 5.	1,893	100.00
:				LING COIL SE										
1	Total C			Coil Airfl		ng DB/W				B/WB/HR	Gross Tot		ass (sf	(%)
	(Tons)	(Mbh)	(Mbh)		Deg F De					Grains	Floor	1,387		
Main Clg	3.7	44.6	32.5	1,326			70.2	54.2	52.4		Part	0		
Aux Clg	0.0	0.0	0.0	0		0.0	0.0	0.0	0.0		ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	1,387		0 0
Totals	3.7	44.6									Wall	867	2	88 33
	HEATING	COIL SEL	ECTION							ENGINEERING		TEMPER		
		Coil A			Type	Coolin	•	Heating		g % OA		Type	Clg	
	(Mbh)			-	Vent			0		g Cfm/Sqft		SADB		101.8
Main Htg	-52.0				Infil	44		442		g Cfm/Ton		Plenum	76.8	
Aux Htg	0.0				Supply	1,32		1,326		g Sqft/Ton	373.35	Return	76.8	
Preheat	-0.0				Mincfm			0		g Btuh/Sqft		Ret/OA	76.8	
Reheat	0.0		0.0		Return	1,32	6	1,326		. People	5	Runarnd	75.0	
Humidif	0.0		0.0		Exhaust		0	0		g % OA	0.0	Fn MtrT		
Opt Vent	0.0		0.0	0.0	Rm Exh		0	0	Нt	g Cfm/SqFt	0.96	Fn 81dT0	0.0	0.0
Total	-52.0				Auxil			•		g Btuh/SqFt				

System 3 Block RAD - RADIATION

	t Time ==>		Mo/Hr:				*	Mo	/Hr:	0/0 *	•	Mo/Hr: 13/	1	
Outside A	ir ==>	0A	DB/WB/HR:	0/ 0/ 0	.0		*	0	ADB:	0 *	(	OADB: 4		
		Space	Ret. Air	Ret: Air	i	Net Pa	* * ercnt	S	pace	Percnt *	Space Pea	k Coil Pea	م لا	eren
	Se	ns.+Lat.	Sensible				f Tot *			Of Tot *				To
nvelope		(Btuh)	(Btuh)				(%) *		tuh)	(%) *				(%
Skylite		0	(554)		(55)	0	0.00 *	-	0	0.00 *		0	•	0.0
Skylite		0	(			Õ	0.00 *		0	0.00 *		٥		0.0
Roof Co		0	(			0	0.00 *		0	0.00 *		0 -1,90		5.
Glass S		0	(			0	0.00 *		0	0.00 *				0.0
Glass (		. 0	. (			0	0.00 *		0	0.00 *		5 -10,29		۰.۰ ۱.(
Wall Co		0	. (	)		0	0.00 *		0	0.00 *	,	-		3.8
Partiti		0	`	,		0	0.00 *		0	0.00 *		•		0.0
Exposed		0				0	0.00 *		0	0.00 *				0.0
Infilt		0				0	0.00 *		0	0.00 *		0 4 -19,62		۰.۰ 1.95
Sub Tot		0	(	)		0	0.00 *		0	0.00 *	•	4 -33,1		)0.
nternal		•	`	•		٠	*		V	*		7 00,1.	.5 10	٠٠.١
Lights	<del></del>	0	(	)		0	0.00 *		0	0.00 *		0	0	0.0
People		0	,			•	0.00 *		0	0.00 *		0		0.0
Misc		0	(	) 0		0	0.00 *		0	0.00 *		0		0.0
Sub Tot	al==>	0	(	-		•	0.00 *		0	0.00 *		0		0.0
eiling t		0	(	-			0.00 *		0	0.00 *		•		0.(
utside A		0	(				0.00 *		0	0.00 *	•	0		0.0
up. Fan				•			0.00 *		•	0.00 *		•		0.0
et. Fan			(	)			0.00 *			0.00 *				0.0
uct Heat			(				0.00 *			0.00 *				0.0
V/UNDR S		0					0.00 *		0	0.00 *		0		0.0
xhaust H	=		(	) 0			0.00 *		•	0.00 *		•		0.0
erminal			(	) 0			0.00 *			0.00 *				0.0
	•						*			*			•	•••
rand <sup>!</sup> Tot	al==>	0	C	0		0	0.00 *		0	0.00 *	-33,10	5 -33,11	3 10	0.0
			000	LING COIL S	BELECTION:							ARFAS		
											Gross Tota			
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	830	(,	( • )
in Clg				0										
x Clg	0.0	0.0	0.0	0	0.0	0.0	0.0		0.0	0.0	ExFlr	0		
t Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	830	0	
tals	0.0	0.0									Wall	553	192	,
	HEATING	COIL SELE	ECTION			-AIRFLO	WS (cfm	)		ENGINEERING	CHECKS	TEMPERATU	IRES (F	: }
	Capacity			Lvg	Type		ling	Heating		g % OA	0.0			Ht
	(Mbh)	(cfi		-	Vent		Õ.	0		g Cfm/Sqft	0.00	SADB		68
in Htg	-33.1		0 0.0		Infil		0	282		g Cfm/Ton	0.00	Plenum		59
x Htg	0.0		0 0.0		Supply		0	0		g Sqft/Ton	0.00	Return		59
eheat	0.0		0.0		Mincfm		0	0		g Btuh/Saft		Ret/OA		59
heat	0.0		0.0		Return		0	0		. People	0	Runarnd		68
midif	0.0		0 0.0		Exhaust		0	0		g % OA	0.0	Fn MtrTD	0.0	0
t Vent	0.0		0 0.0		Rm Exh		0	0		g Cfm/SqFt	0.00	Fn BldTD	0.0	0
tal	-33.1				Auxil		0	0		g 8tuh/SqFt		Fn Frict	0.0	0

System 4 Block UH - UNIT HEATERS

Peaked at			Mo/Hr:		_				Hr:	,		Mo/Hr: 1		
Outside Ai	ir ==>	0A	DB/WB/HR:	0/ 0/ 0.	0		*	0A	DB:	k 0		OADB:	4	
		Space	Ret. Ai	r Ret. Air	Ne	t Peri	cnt *	Sr	ace	Percnt *		ak Coil	Deak	Percn
	Se	ns.+Lat.	Sensible		. Tota			Sensi		Of Tot *			Sens	Of To
invelope (		(Btuh)	(Btuh		(Btuh		(%) *		uh)	(%) *			Stuh)	(%
Skylite		0		)			.00 *	(55	0	0.00 *		0	0	0.0
Skylite		0		)			.00 *		0	0.00		0	0	0.0
Roof Cor		0		)			.00 *		0	0.00 *			-	9.
Glass So		0	(	)			.00 *		0	0.00 *		0 -20	0	0.0
Glass Co	and	0	(	)			.00 *		0	0.00 *		55 -73	3.355	33.
Wall Cor	nd	0		)			.00 *		0	0.00 *	-5.2	19 -	7.222	3.1
Partitio	n	0					.00 *		0	0.00 *		0	0	0.0
Exposed	Floor	0					.00 *		0	0.00 *			0	0.
Infiltra		0					.00 *		0	0.00 *		64 -120		54.
Sub Tota		0	(	)			.00 *		0	0.00 *	•		1,762	100.
nternal t						•	*		•	*			,	- • • •
Lights		0	(	)		0 0	.00 *		0	0.00 *		0	0	0.
People		0				0 0	.00 *		0	0.00 *		0	0	0.
Misc		0	(	) 0		0 0	.00 *		0	0.00 *		0	0	0.
Sub Tota	al::>	0	(	) 0		0 0	.00 *		0	0.00 *		0	0	0.4
eiling Lo	oad	0	(	)		0 0	.00 *		0	0.00 *	-22,9	76	0	0.
utside Ai	ir	0	(	) 0		0 0	.00 *		0	0.00 *		0	0	0.
up. Fan h	leat					0 0	.00 *			0.00 *			0	0.
et. Fan H			(	)		0 0.	.00 *			0.00 *			0	0.
oct Heat	Pkup		(	)		0 0	.00 *			0.00 *			0	0.
V/UNDR Si	zing	0				0 0	.00 *		0	0.00 *		0	0	0.
xhaust He			(	) 0		0 0	.00 *			0.00 *			0	0.
erminal 8	Bypass -		(	) 0		0 0.	.00 *			0.00 *			0	0.
.1							*			*				
rand Tota	11==>	0	(	) 0		0 0.	.00 *		0	0.00 *	-222,0	13 -221	,762	100.
				LING COIL S										
											Gross Tot		ass (si	f) (%
	(Tons)			(cfm)								•		
irn cig ix Clg	0.0			0										
t Vent	0.0	0.0	0.0 0.0	0	0.0 0.0	0.0	0.0	0.0 0.0	0.0	0.0	Exflr Roof	0 005		0
tals	0.0	0.0	0.0	V	0.0	0.0	0.0	0.0	0.0	0.0	Wall	8,985 3,392	1,3	0 368
	-HEATING	COIL SEL	ECTION		A	IRFLOWS	S (cfm)			ENGINEERING	CHECKS	TEMPER	RATURES	S (F)
	Capacity				Type	Cool		Heating		g % OA	0.0	Туре	Clg	
:	(Mbh)	(cf			Vent		Ō	0		g Cfm/Sqft		SADB	-	0 116
in Htg	-223.8	4,		-	Infil		0	1,730		g Cfm/Ton		Plenum	0.0	
x Htg	0.0		0 0.0	0.0	Supply		0	4,192		g Sqft/Ton		Return	0.0	
eheat	0.0		0.0	0.0	Mincfm		0	0		g Btuh/Sqft		Ret/OA	0.0	
heat	0.0		0.0	0.0	Return		0	4,192		. People	0	Runarnd	0.0	
midif	0.0	ı	0 0.0	0.0	Exhaust		0	0	Ht	g % OA	0.0	Fn MtrT(		
t Vent	0.0		0.0	0.0	Rm Exh		0	0		g Cfm/SqFt		Fn BldT0		
tal	-223.8				Auxil		0	0		g Btuh/SqFt		Fn Frict		

BUILDING U-VALUES - ALTERNATIVE 2 COMBINED ECOS

						ım U-Val ı/hr/sq1		·	· • • • • • • • •		Room	Room
Room				Summr	•	1/111/5Q1	' '	612 6			Mass	Capac.
Number	Docarintian	Non+	CVC) "		Wintr	06	Summr	Wintr			(1b/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	KOOT	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	45.6	9.75
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	45.6	9.75
2	LIQUOR STORE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.058	0.317	101.9	22.09
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.058	0.317	101.9	22.09
4	LIBRARY	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
5	GAME ROOM	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	50.2	11.09
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	77.9	17.56
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
8	2ND FL TOILETS	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	64.3	14.59
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	64.3	14.59
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	80.2	18.06
3	LIQUOR STORAGE	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	30.1	6.35
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	30.1	6.35
4	LIBRARY	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
5	GAME ROOM	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.4	11.03
Buildin	g	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	51.8	11.58

BUILDING AREAS - ALTERNATIVE 2 COMBINED ECOS

----- BUILDING AREAS -----

		Mumb	or of	Floor Area/Dupl	Total	Doubition	Exposed	Classic about	01-1	N=+ 0==+	M2 - 4	u.	
Room			icate	Room	Area	Partition Area	Floor Area	Skylight	Skl	Net Roof	Window		Net Wall
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	Area (sqft)	/Rf (%)	Area (sqft)	Area (sqft)	/W1 (%)	Area (sqft)
				(-4,-7	(-4)	(-4.0)	(04.0)	(04.0)	( • )	(54,0)	(34,0)	(*)	(3410)
1	1ST FL OFFICES	1	1	8,053	8,053	0	0	0	0	0	624	24	1,926
Zone	<pre>1 Total/Ave.</pre>				8,053	0	0	0	0	0	624	24	1,926
2	LIQUOR STORE	1	1	1,127	1,127	0	0	0	0	0	0	0	739
Zone	<pre>2 Total/Ave.</pre>				1,127	0	0	0	0	0	0	0	739
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
System	<pre>1 Total/Ave.</pre>				17,026	0	0	0	0	7,846	1,776	30	4,174
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
System	2 Total/Ave.				1,387	0	0	0	0	1,387	288	33	579
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
8	2ND FL TOILETS	1	1	582	582	0	0	0	0	582	96	34	184
Zone	8 Total/Ave.				582	0	0	0	0	582	96	34	184
System	3 Total/Ave.				830	0	0	0	0	830	192	35	360
3	LIQUOR STORAGE	1	1	901	901	0	0	0	0	0	24	18	112
Zone	3 Total/Ave.				901	0	0	0	0	0	24	18	112
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.			•	1,139	0	0	0	Ō	1,139	192	32	403
System	4 Total/Ave.				9,886	0	0	0	0	8,985	1,368	40	2,023
Buildin	g				29,129	0	0	0	0	19,048	3,624	34	7,137

ASHRAE 90 ANALYSIS - ALTERNATIVE 2 COMBINED ECOS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.041 (Btu/Hr/Sq Ft/F) Overall Wall U-Value = 0.311 (Btu/Hr/Sq Ft/F) . Overall Building U-Value = 0.139 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 2.27 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 32.24 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 COMBINED ECOS

SYSTEM LOAD PROFILE------

## System Totals

Percent	Cool	ing Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design Load	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	1.8	5	38	-34,091	22	432	994.9	0	0	0.0	0	0
5 - 10	3.6	3	22	-68,182	25	481	1,989.9	0	0	0.0	0	0
10 - 15	5.4	6	53	-102,272	18	343	2,984.8	0	0	0.0	0	0
15 - 20	7.2	10	84	-136,363	1	15	3,979.8	0	0	0.0	0	0
20 - 25	9.0	8	62	-170,454	2	43	4,974.7	59	3,638	0.0	0	0
25 - 30	10.8	8	66	-204,545	2	30	5,969.7	0	0	0.0	0	0
30 - 35	12.6	4	36	-238,636	1	28	6,964.6	0	0	0.0	0	0
35 - 40	14.5	5	38	-272,727	1	23	7,959.6	0	0	0.0	0	0
40 - 45	16.3	7	54	-306,817	1	21	8,954.5	0	0	0.0	0	0
45 - 50	18.1	6	46	-340,908	1	24	9,949.5	24	1,450	0.0	0	0
50 - 55	19.9	9	71	-374,999	1	23	10,944.4	0	0	0.0	0	0
55 - 60	21.7	6	50	-409,090	2	46	11,939.4	0	0	0.0	0	0
60 - 65	23.5	4	31	-443,181	22	434	12,934.3	0	0	0.0	0	0
65 - 70	25.3	2	15	-477,272	0	0	13,929.3	0	0	0.0	0	0
70 - 75	27.1	8	65	-511,362	0	0	14,924.2	0	0	0.0	0	0
75 - 80	28.9	5	42	-545,453	0	0	15,919.2	17	1,070	0.0	0	0
80 - 85	30.7	0	0	-579,544	0	0	16,914.1	0	0	0.0	0	0
85 - 90	32.5	0	0	-613,635	0	0	17,909.1	0	0	0.0	0	0
90 - 95	34.3	2	20	-647,726	0	0	18,904.0	0	0	0.0	0	0
95 - 100	36.1	3	25	-681,817	0	0	19,899.0	0	0	0.0	0	0
Hours Off	0.0	0	7,942	0	0	6,817	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 COMBINED ECOS

~~~~~~					BUI	LDI	NG	TEM	PER	ATU	RE P	R 0 F	I L E \$
Temperature										Zone Ni	umber		
Range (F)	1	2	4	5	6	7	. 7	8					
Max. Temp.	83.0	79.1	87.5	86.1	84.9	86.5	106.8	105.7	143.9	110.3	108.2	105.8	
Mo./Hr.	7 21	7 23	7 21	7 20	7 20	7 20	8 20	8 21	9 19	8 21	7 20	8 19	
Day Type	4	1	4	4	4	4	1	1	2	1	2	1	
	-												
		<b></b>		<i></i>					Nu	mber o	f Hour	s	····
Above 100	0	0	0	0	0	0	1,759	1,237	2,928	2,035	1,418	1,254	
95 - 100	0	0	0	0	0	0	825	993	44	730	1,146	1,072	
90 - 95	0	0	0	0	0	0	344	690	697	191	163	562	
85 - 90	0	0	126	63	0	69	141	44	347	467	521	84	
80 - 85	486	0	1,367	1,137	651	1,019	491	526	517	334	424	502	
75 - 80	2,911	2,682	2,150	2,222	2,496	2,312	520	573	552	339	85	419	
70 - 75	803	1,075	461	539	780	692	149	101	1,352	464	471	231	
65 - 70	2,159	2,294	612	195	254	281	2,173	2,203	1,462	2,037	1,907	2,011	
60 - 65	1,154	1,444	825	1,052	840	1,117	1,006	1,089	330	904	1,143	1,221	
55 - 60	536	670	559	418	650	422	660	616	320	566	640	646	
50 - 55	338	407	1,297	937	855	1,444	692	688	211	693	842	758	
8elow 50	373	188	1.363	2,197	2,234	1,404	0	0	0	0	0	0	
Min. Temp.	41.6	44.3	37.1	33.8	34.8	37.8	54.9	54.9	54.9	54.9	54.9	54.9	
Mo./Hr.	2 7	2 7	2 8	2 8	2 8	2 9	1 9	1 11	1 14	1 10	1 10	1 11	
Day Type	5	5	5	5	5	5	3	3	4	3	3	3	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2 COMBINED ECOS

------ MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (k\)	HOT WTR On Peak (Therm)	HOT W DMND Qn Peak (Thrm/hr)
Jan	8,956	46	795	4
Feb	8,103	46	773	4
March	9,805	46	452	4
April	8,524	46	85	4
May	11,007	92	0	. 0
June	14.276	103	0	0
July	16,380	106	0	0
Aug	15,202	103	0	0
Sept	10,451	101	0	0
Oct	9,376	46	59	4
Nov	8,525	46	259	4
Dec	8,529	46	628	4
Total	129,136	106	3,052	4

Building Energy Consumption = 25,607 (Btu/Sq Ft/Year)
Source Energy Consumption = 59,365 (Btu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)

2 EQ5303

CONTROLS

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 COMBINED ECOS

----- EQUIPMENT ENERGY CONSUMPTION--------

	Equip - Code	Jan	Feb	Mar	Apr	May	June	umption July	Aug	Sep	Oct	Nov	Dec	Tota
1	LIGHTS													
	ELEC	8396	7596	9195	7996	8796	8796	7996	0105	7004	070/	7007	7007	100 74
	PK	43.7	43.7	43.7	43.7				9195	7996	8796	7996	7996	100,74
•	rn	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.
ì	MISC LD			*										
1	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	
F	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
ħ	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
	WT00 I D													
	MISC LD DIL	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
			•••	•••	0.0	•••	010	•.•	0.0	0.0	0.0	0.0	0.0	V
	MISC LD	^	٥	۸	^	2	^	^	^	•	•	•		
	P STEAM PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0	0	0	0	
r	rn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
	MISC LD													N
	P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	
F	PK .	0.0	0.0	0.0	. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
M	MISC LD													
۶	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	
۶	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
F	EQ1161		ATR-	CLD COND	COMP <1	5 TONS								
	ELEC	0	0	0	0	610	3151	5631	3519	855	0	0	0	13,7
	PK	0.0	0.0	0.0	0.0	39.1	43.4	44.9	43.5	41.9	0.0	0.0	0.0	44
r	EQ5200		0010	CHOCO CV	NG.									
	ELEC	0	0	ENSER FA O	NO 0	64	283	544	322	89	۸	۸	^	. 7
	PK	0.0	0.0			1.6	3.1	4.0	3.4	2.5	0 0.0	0 0.0	0 0.0	1,3
	:													
	EQ5303	•	CONT		•		,,		40					_
	ELEC PK	0 0.0	0.0	0.0	0 0.0	23 0.3	66 0.3	60 0.3	69 0.3	26 0.3	0.0	0 0.0	0 0.0	2
	T IX	0.0	V.V	V.V	0.0	0.5	V.J	V.5	0.5	0.5	0.0	0.0	0.0	0
	EQ1161			CLD COND		5 TONS								
	ELEC	0	0	0	0	0	367	658	415	77	0	0	0	1,5
۶	PΚ	0.0	0.0	0.0	0.0	0.0	5.0	5.1	5.0	4.8	0.0	0.0	0.0	5
5	EQ5200		COND	ENSER FA	NS									
	ELEC	0	0	0	0	0	33	64	38	8	0	0	0	1
	ΣĶ	0.0		0.0		0.0	0.4	0.5	0.4	0.3	0.0	0.0	0.0	. 0

V 600 PAGE 29

EQUIPMENT	ENERGY	CONSUMPTION	-	ALTERNATIVE :	2
COMBINED E	COS				

	ELEC	0	0	0	0	0	66	60	69	22	0	0	0	217
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	554	501	606	527	1490	1490	1345	1548	1354	580	527	527	11,049
	PK	2.6	2.6	2.6	2.6	6.8	6.8	6.7	6.8	6.8	2.6	2.6	2.6	6.8
2	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	0	0	0	0	25	25	23	26	23	0	0	0	121
	PK	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
4	EQ4381		PROP	ELLER FA	N									
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2102		PURC	HASED DI	ST. HOT	WATER								
	P HOTH20	795	773	452	85	0	0	0	0	0	59	259	628	3,052
	ÞΚ	4.2	4.2	4.2	4.2	0.0	0.0	0.0	0.0	0.0	4.1	4.2	4.2	4.2
1	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	6	6	4	1	0	0	0	0	0	0	2	6	25
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1

:

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UTILITY PEAK CHECKSUMS - ALTERNATIVE 2 COMBINED ECOS

 UTILITY	PEAK	C H E C K S U M S

Utility	ELECTRIC DEMAND	
	e 105.6 (kW) me of Peak 15 (hr) 7 (	mo)

Hour 15 Month 7

	quipment ode Name	Equipment	Description	Utility Demand (kW)		
Cooling Equi	pment					
1 2		COMP <15 TONS COMP <15 TONS		49.2 5.9	46.56 5.58	
Sub Total				55.1	52.15	
Sub Total				0.0	0.00	
Air Moving E	quipment					
1 2		FAN ELECTRICAL FAN ELECTRICAL		6.7 0.1	6.37 0.11	
Sub Total				6.8	6.47	
Sub Total				0.0	0.00	
Miscellaneous	S					
Lights Base Utiliti Misc Equipme Sub Total					41.38 0.00 0.00 41.38	
Grand Total				105.6	100.00	

Building 101 (Typical for 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, and 114)

Trace Input File

```
CONTENTS OF : E:\CB101-14.TM
LINE #
   1
       JOB - 1
   2
       01/ENERGY SAVINGS OPPORTUNITY STUDY
   3
       01/CARLISLE BARRACKS, PA
   4
       01/DEPARTMENT OF THE ARMY
   5
       01/BENATEC ASSOCIATES
   6
       01/BUILDINGS 101-114
   7
       08/CARLISLE
   8
       09/MAY/SEP////APR/OCT
   9
       10/CLTD-CLF
  10
       11///ZONE
  11
       LOAD - 1
  12
       19/1/BASE BUILDING
       20/1/1/TV ROOM/160/1/1/0//9.5
  13
  14
       20/2/1/LIVING ROOM/280/1/1/.75/.45/9.5
  15
       20/3/1/LIVING ROOM/280/1/1/.75/.45/9.5
  16
       20/4/1/TV ROOM/160/1/1/0//9.5
 17
       20/5/1/BEDROOM/156/1/1/0//9
       20/6/1/BEDROOM/145/1/1/0//9
 18
       20/7/1/BEDROOM/156/1/1/0//9
 19
       20/8/1/BEDROOM/145/1/1/0//9
 20
  21
       20/9/2/DINING ROOM/148/1/1/.75/.45/9.5
       20/10/2/KITCHEN/108/1/1/.75/.45/9.5
 22
 23
       20/11/2/KITCHEN/108/1/1/.75/.45/9.5
 24
       20/12/2/DINING ROOM/148/1/1/.75/.45/9.5
 25
       20/13/2/REAR FOYER/33/1/2/0//9.5
       20/14/2/REAR FOYER/33/1/2/0//9.5
 26
 27
       20/15/2/BEDROOM/80/1/1/0//9
 28
       20/16/2/BEDROOM/80/1/1/0//9
       20/17/2/HALL/70/1/1/0//9
 29
 30
       20/18/2/HALL/70/1/1/0//9
 31
       20/19/2/BATH/53/1/1/0//9
 32
       20/20/2/BATH/53/1/1/0//9
 33
       21/M///CBLQTX///CBLQTX
 34
       22/1/1/YES////171
 35
       22/4/1/YES////171
 36
       22/5/1/YES////171
 37
       22/6/1/YES////171
 38
       22/7/1/YES////171
 39
       22/8/1/YES////171
 40
       22/13/1/YES////171
 41
       22/14/1/YES////171
 42
       22/15/1/YES////171
 43
       22/16/1/YES////171
 44
       22/17/1/YES////171
 45
       22/18/1/YES////171
 46
       22/19/1/YES////171
 47
       22/20/1/YES////171
 48
       24/1/1/10/8.5//170/0
 49
       24/1/2/16/8.5//170/270
 50
       24/1/3/10/8.5//170/180
 51
       24/2/1/12/8.5//170/180
 52
       24/3/1/12/8.5//170/180
 53
       24/4/1/10/8.5//170/0
 54
       24/4/2/16/8.5//170/90
 55
       24/4/3/10/8.5//170/180
 56
       24/5/1/11/8.25//170/0
 57
       24/5/2/12/8.25//170/270
 58
       24/6/1/12/8.25//170/270
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CONTENTS OF : E:\CB101-14.TM
LINE #
  59
       24/6/2/12/8.25//170/180
  60
       24/7/1/11/8.25//170/0
  61
       24/7/2/12/8.25//170/90
  62
       24/8/1/12/8.25//170/90
  63
       24/8/2/12/8.25//170/180
  64
       24/9/1/11/8.5//170/0
  65
       24/9/2/11/8.5//170/270
  66
       24/12/1/11/8.5//170/0
  67
       24/12/2/11/8.5//170/90
  68
       24/13/1/5/8.5//170/270
  69
       24/13/2/6/8.5//170/180
  70
       24/14/1/5/8.5//170/90
  71
       24/14/2/8/8.5//170/180
  72
       24/15/1/8/8.25//170/0
  73
       24/16/1/8/8.25//170/0
  74
       24/19/1/7/8.25//170/180
  75
       24/20/1/7/8.25//170/180
  76
       25/1/1/20/1/1/.81/.64
  77
       25/1/2/5/2.5/3/.81/.64
  78
       25/1/3/20/1/1/.81/.64
  79
       25/2/1/20/1/1/.81/.64
  80
       25/3/1/20/1/1/.81/.64
       25/4/1/20/1/1/.81/.64
  81
  82
       25/4/2/5/2.5/1/.81/.64
       25/4/3/20/1/1/.81/.64
  83
  84
       25/5/1/4/2.5/1/.81/.64
  85
       25/5/2/4/2.5/1/.81/.64
  86
       25/6/1/4/2.5/1/.81/.64
  87
       25/6/2/4/2.5/1/.81/.64
  88
       25/7/1/4/2.5/1/.81/.64
       25/7/2/4/2.5/1/.81/.64
  89
       25/8/1/4/2.5/1/.81/.64
  90
  91
       25/8/2/4/2.5/1/.81/.64
  92
       25/9/1/5/2.5/1/.81/.64
  93
       25/9/2/5/2.5/1/.81/.64
       25/12/1/5/2.5/1/.81/.64
  94
  95
       25/12/2/5/2.5/1/.81/.64
  96
       25/13/1/3.5/1/1/.81/.64
  97
       25/13/2/5/2.5/1/.81/.64
  98
       25/14/1/3.5/1/1/.81/.64
  99
       25/14/2/5/2.5/1/.81/.64
 100
       25/15/1/4/2.5/1/.81/.64
       25/16/1/4/2.5/1/.81/.64
 101
 102
       25/19/1/4/2.5/1/.81/.64
 103
       25/20/1/4/2.5/1/.81/.64
 104
       26/M/CBLQP/CBLQL/CBLQCLG//OFF/CBLQCLG/OFF/OFF/OFF/OFF
       27/M/308/SF-PERS/230/190/.5/WATT-SF/INCAND
 105
       29/1/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
106
       29/2/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
107
108
       29/3/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
       29/4/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
109
       29/5/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
110
111
       29/6/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
112
       29/7/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
       29/8/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
 113
114
       29/9/////.28/CFM-SF
115
       29/10/////.28/CFM-SF
116
       29/11/////.28/CFM-SF
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CONTENTS OF : E:\CB101-14.TM
LINE #
 117
       29/12/////.28/CFM-SF
118
       29/13/////.28/CFM-SF
119
       29/14//////.28/CFM-SF
 120
       29/15//////.28/CFM-SF
121
       29/16//////.28/CFM-SF
122
       29/17/////.28/CFM-SF
123
       29/18/////.28/CFM-SF
124
       29/19//////.28/CFM-SF
125
       29/20/////.28/CFM~SF
126
       SYSTEM - 1
       39/1/BASE BUILDING
127
128
       40/1/PTAC
129
       41/1/1/1
130
       42/1/.25
       45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
131
132
       40/2/RAD
133
       41/2/1/2
134
       45/2/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
135
       EQUIPMENT - 1
136
       59/1/CARLISLE///BASE BUILDING
137
       60/1/1/PKPLANT/1/1
138
       62/1/EQ1161/6
139
       65/1/1//2/2
140
       67/1/EQ2102/1
141
       69/1/E04003
142
       LOAD - 2
 143
       19/2/WALL & ROOF INSULATION
144
       20/1/1/TV ROOM/160/1/1/0//9.5
145
       20/2/1/LIVING ROOM/280/1/1/.75/.45/9.5
146
       20/3/1/LIVING ROOM/280/1/1/.75/.45/9.5
 147
       20/4/1/TV ROOM/160/1/1/0//9.5
148
       20/5/1/BEDROOM/156/1/1/0//9
      20/6/1/BEDROOM/145/1/1/0//9
149
150
       20/7/1/BEDROOM/156/1/1/0//9
151
       20/8/1/BEDROOM/145/1/1/0//9
       20/9/2/DINING ROOM/148/1/1/.75/.45/9.5
152
153
       20/10/2/KITCHEN/108/1/1/.75/.45/9.5
154
       20/11/2/KITCHEN/108/1/1/.75/.45/9.5
155
       20/12/2/DINING ROOM/148/1/1/.75/.45/9.5
156
       20/13/2/REAR FOYER/33/1/2/0//9.5
157
       20/14/2/REAR FOYER/33/1/2/0//9.5
158
       20/15/2/BEDROOM/80/1/1/0//9
159
       20/16/2/BEDROOM/80/1/1/0//9
       20/17/2/HALL/70/1/1/0//9
160
       20/18/2/HALL/70/1/1/0//9
161
       20/19/2/BATH/53/1/1/0//9
162
163
       20/20/2/BATH/53/1/1/0//9
       21/M///CBLQTX///CBLQTX
164
165
       22/1/1/YES////191
166
       22/4/1/YES////191
167
       22/5/1/YES////191
       22/6/1/YES////191
168
169
       22/7/1/YES////191
170
       22/8/1/YES////191
171
       22/13/1/YES////191
172
       22/14/1/YES////191
173
       22/15/1/YES////191
174
       22/16/1/YES////191
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CONTENTS OF : E:\CB101-14.TM
LINE #
175
       22/17/1/YES////191
176
       22/18/1/YES////191
177
       22/19/1/YES////191
178
       22/20/1/YES////191
179
       24/1/1/10/8.5//183/0
180
       24/1/2/16/8.5//183/270
181
       24/1/3/10/8.5//183/180
182
       24/2/1/12/8.5//183/180
183
       24/3/1/12/8.5//183/180
184
       24/4/1/10/8.5//183/0
185
       24/4/2/16/8.5//183/90
186
       24/4/3/10/8.5//183/180
187
       24/5/1/11/8.25//183/0
188
       24/5/2/12/8.25//183/270
189
       24/6/1/12/8.25//183/270
190
       24/6/2/12/8.25//183/180
191
       24/7/1/11/8.25//183/0
192
       24/7/2/12/8.25//183/90
193
       24/8/1/12/8.25//183/90
194
       24/8/2/12/8.25//183/180
195
       24/9/1/11/8.5//183/0
196
       24/9/2/11/8.5//183/270
197
       24/12/1/11/8.5//183/0
198
       24/12/2/11/8.5//183/90
199
       24/13/1/5/8.5//183/270
200
       24/13/2/6/8.5//183/180
201
       24/14/1/5/8.5//183/90
202
      24/14/2/8/8.5//183/180
203
       24/15/1/8/8.25//183/0
204
      24/16/1/8/8.25//183/0
205
       24/19/1/7/8.25//183/180
206
      24/20/1/7/8.25//183/180
      25/1/1/20/1/1/.81/.64
207
208
      25/1/2/5/2.5/3/.81/.64
209
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210
      25/2/1/20/1/1/.81/.64
211
      25/3/1/20/1/1/.81/.64
212
      25/4/1/20/1/1/.81/.64
      25/4/2/5/2.5/1/.81/.64
213
214
      25/4/3/20/1/1/.81/.64
215
      25/5/1/4/2.5/1/.81/.64
216
      25/5/2/4/2.5/1/.81/.64
217
      25/6/1/4/2.5/1/.81/.64
218
      25/6/2/4/2.5/1/.81/.64
219
      25/7/1/4/2.5/1/.81/.64
220
      25/7/2/4/2.5/1/.81/.64
221
      25/8/1/4/2.5/1/.81/.64
222
      25/8/2/4/2.5/1/.81/.64
223
      25/9/1/5/2.5/1/.81/.64
224
      25/9/2/5/2.5/1/.81/.64
225
      25/12/1/5/2.5/1/.81/.64
226
      25/12/2/5/2.5/1/.81/.64
227
      25/13/1/3.5/1/1/.81/.64
228
      25/13/2/5/2.5/1/.81/.64
229
      25/14/1/3.5/1/1/.81/.64
230
      25/14/2/5/2.5/1/.81/.64
231
      25/15/1/4/2.5/1/.81/.64
232
      25/16/1/4/2.5/1/.81/.64
```

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CONTENTS OF : E:\CB101-14.TM
LINE #
 233
       25/19/1/4/2.5/1/.81/.64
234
       25/20/1/4/2.5/1/.81/.64
235
       26/M/CBLQP/CBLQL/CBLQCLG//OFF/CBLQCLG/OFF/OFF/OFF
 236
       27/M/308/SF-PERS/230/190/.5/WATT-SF/INCAND
 237
       29/1/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
238
       29/2/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
239
       29/3/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
240
       29/4/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
241
       29/5/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
242
       29/6/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
243
       29/7/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
244
       29/8/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
245
       29/9/////.23/CFM-SF
       29/10/////.23/CFM-SF
246
247
       29/11/////.23/CFM-SF
248
       29/12//////.23/CFM-SF
249
       29/13/////.23/CFM-SF
250
       29/14/////.23/CFM-SF
251
       29/15//////.23/CFM-SF
252
       29/16//////.23/CFM-SF
253
       29/17//////.23/CFM-SF
254
       29/18//////.23/CFM-SF
255
       29/19/////.23/CFM-SF
256
       29/20/////.23/CFM-SF
257
       SYSTEM - 2
258
       39/2/WALL & ROOF INSULATION
259
       40/1/PTAC
       41/1/1/1
260
261
       42/1/.25
262
       45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
263
       40/2/RAD
264
       41/2/1/2
265
       45/2/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
266
       EQUIPMENT - 2
267
       59/2/CARLISLE///WALL & ROOF INSULATION
268
       60/1/1/PKPLANT/1/1
269
       62/1/EQ1161/6
270
       65/1/1//2/2
271
       67/1/EQ2102/1
272
       69/1/EQ4003
273
       LOAD - 3
274
       19/3/WEATHERSTRIP & CAULKING
275
       20/1/1/TV ROOM/160/1/1/0//9.5
276
       20/2/1/LIVING ROOM/280/1/1/.75/.45/9.5
277
       20/3/1/LIVING ROOM/280/1/1/.75/.45/9.5
278
       20/4/1/TV ROOM/160/1/1/0//9.5
279
       20/5/1/BEDROOM/156/1/1/0//9
280
       20/6/1/BEDROOM/145/1/1/0//9
281
       20/7/1/BEDROOM/156/1/1/0//9
       20/8/1/BEDROOM/145/1/1/0//9
282
283
       20/9/2/DINING ROOM/148/1/1/.75/.45/9.5
       20/10/2/KITCHEN/108/1/1/.75/.45/9.5
284
285
       20/11/2/KITCHEN/108/1/1/.75/.45/9.5
286
       20/12/2/DINING ROOM/148/1/1/.75/.45/9.5
287
       20/13/2/REAR FOYER/33/1/2/0//9.5
288
       20/14/2/REAR FOYER/33/1/2/0//9.5
289
       20/15/2/BEDROOM/80/1/1/0//9
290
       20/16/2/BEDROOM/80/1/1/0//9
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CONTENTS OF : E:\CB101-14.TM
LINE #
 291
       20/17/2/HALL/70/1/1/0//9
 292
       20/18/2/HALL/70/1/1/0//9
 293
       20/19/2/BATH/53/1/1/0//9
 294
       20/20/2/BATH/53/1/1/0//9
 295
       21/M///CBLQTX///CBLQTX
 296
       22/1/1/YES////171
 297
       22/4/1/YES////171
 298
       22/5/1/YES////171
299
       22/6/1/YES////171
 300
       22/7/1/YES////171
301
       22/8/1/YES////171
302
       22/13/1/YES////171
303
       22/14/1/YES////171
       22/15/1/YES////171
304
305
       22/16/1/YES////171
306
       22/17/1/YES////171
307
       22/18/1/YES////171
308
       22/19/1/YES////171
309
       22/20/1/YES////171
       24/1/1/10/8.5//170/0
310
311
       24/1/2/16/8.5//170/270
312
       24/1/3/10/8.5//170/180
313
       24/2/1/12/8.5//170/180
314
       24/3/1/12/8.5//170/180
315
       24/4/1/10/8.5//170/0
316
       24/4/2/16/8.5//170/90
317
       24/4/3/10/8.5//170/180
318
       24/5/1/11/8.25//170/0
319
       24/5/2/12/8.25//170/270
320
       24/6/1/12/8.25//170/270
321
       24/6/2/12/8.25//170/180
322
       24/7/1/11/8.25//170/0
323
       24/7/2/12/8.25//170/90
324
      24/8/1/12/8.25//170/90
325
      24/8/2/12/8.25//170/180
326
      24/9/1/11/8.5//170/0
327
      24/9/2/11/8.5//170/270
328
      24/12/1/11/8.5//170/0
329
      24/12/2/11/8.5//170/90
330
      24/13/1/5/8.5//170/270
331
      24/13/2/6/8.5//170/180
332
      24/14/1/5/8.5//170/90
333
      24/14/2/8/8.5//170/180
334
      24/15/1/8/8.25//170/0
335
      24/16/1/8/8.25//170/0
336
      24/19/1/7/8.25//170/180
337
      24/20/1/7/8.25//170/180
338
      25/1/1/20/1/1/.81/.64
      25/1/2/5/2.5/3/.81/.64
339
340
      25/1/3/20/1/1/.81/.64
      25/2/1/20/1/1/.81/.64
341
342
      25/3/1/20/1/1/.81/.64
343
      25/4/1/20/1/1/.81/.64
344
      25/4/2/5/2.5/1/.81/.64
345
      25/4/3/20/1/1/.81/.64
346
      25/5/1/4/2.5/1/.81/.64
347
      25/5/2/4/2.5/1/.81/.64
348
      25/6/1/4/2.5/1/.81/.64
```

```
CONTENTS OF : E:\CB101-14.TM
LINE
 349
       25/6/2/4/2.5/1/.81/.64
 350
       25/7/1/4/2.5/1/.81/.64
 351
       25/7/2/4/2.5/1/.81/.64
 352
       25/8/1/4/2.5/1/.81/.64
353
       25/8/2/4/2.5/1/.81/.64
354
       25/9/1/5/2.5/1/.81/.64
355
       25/9/2/5/2.5/1/.81/.64
356
       25/12/1/5/2.5/1/.81/.64
357
       25/12/2/5/2.5/1/.81/.64
358
       25/13/1/3.5/1/1/.81/.64
       25/13/2/5/2.5/1/.81/.64
359
360
       25/14/1/3.5/1/1/.81/.64
361
       25/14/2/5/2.5/1/.81/.64
362
       25/15/1/4/2.5/1/.81/.64
363
       25/16/1/4/2.5/1/.81/.64
       25/19/1/4/2.5/1/.81/.64
364
      25/20/1/4/2.5/1/.81/.64
365
      26/M/CBLQP/CBLQL/CBLQCLG//OFF/CBLQCLG/OFF/OFF/OFF
366
367
      27/M/308/SF-PERS/230/190/.5/WATT-SF/INCAND
368
      29/1/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
369
      29/2/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
      29/3/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
370
371
      29/4/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
      29/5/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
372
373
      29/6/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
374
      29/7/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
375
      29/8/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
376
      29/9//////.26/CFM-SF
377
      29/10/////.26/CFM-SF
378
      29/11/////.26/CFM-SF
379
      29/12/////.26/CFM-SF
380
      29/13/////.26/CFM-SF
381
      29/14/////.26/CFM-SF
382
      29/15//////.26/CFM-SF
383
      29/16//////.26/CFM-SF
384
      29/17/////.26/CFM-SF
385
      29/18/////.26/CFM-SF
386
      29/19/////.26/CFM-SF
387
      29/20//////.26/CFM-SF
388
      SYSTEM - 3
389
      39/3/WEATHERSTRIP & CAULKING
390
      40/1/PTAC
391
      41/1/1/1
392
      42/1/.25
      45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
393
394
      40/2/RAD
      41/2/1/2
395
      45/2/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF
396
397
      EQUIPMENT - 3
      59/3/CARLISLE///WEATHERSTRIP & CAULKING
398
399
      60/1/1/PKPLANT/1/1
400
      62/1/EQ1161/6
401
      65/1/1//2/2
402
      67/1/EQ2102/1
403
      69/1/EQ4003
404
      LOAD - 4
405
      19/4/COMBINED ECOS
406
      20/1/1/TV ROOM/160/1/1/0//9.5
```

```
CONTENTS OF : E:\CB101-14.TM
LINE #
 407
       20/2/1/LIVING ROOM/280/1/1/.75/.45/9.5
       20/3/1/LIVING ROOM/280/1/1/.75/.45/9.5
 408
 409
       20/4/1/TV ROOM/160/1/1/0//9.5
       20/5/1/BEDROOM/156/1/1/0//9
 410
 411
       20/6/1/BEDROOM/145/1/1/0//9
412
       20/7/1/BEDROOM/156/1/1/0//9
413
       20/8/1/BEDROOM/145/1/1/0//9
414
       20/9/2/DINING ROOM/148/1/1/.75/.45/9.5
415
       20/10/2/KITCHEN/108/1/1/.75/.45/9.5
416
       20/11/2/KITCHEN/108/1/1/.75/.45/9.5
417
       20/12/2/DINING ROOM/148/1/1/.75/.45/9.5
418
       20/13/2/REAR FOYER/33/1/2/0//9.5
       20/14/2/REAR FOYER/33/1/2/0//9.5
419
420
       20/15/2/BEDROOM/80/1/1/0//9
421
       20/16/2/BEDROOM/80/1/1/0//9
422
       20/17/2/HALL/70/1/1/0//9
423
       20/18/2/HALL/70/1/1/0//9
424
       20/19/2/BATH/53/1/1/0//9
       20/20/2/BATH/53/1/1/0//9
425
       21/M///CBLQTX///CBLQTX
426
427
       22/1/1/YES////191
428
       22/4/1/YES////191
429
       22/5/1/YES////191
430
       22/6/1/YES////191
       22/7/1/YES////191
431
432
       22/8/1/YES////191
433
       22/13/1/YES////191
434
       22/14/1/YES////191
435
       22/15/1/YES////191
436
       22/16/1/YES////191
437
       22/17/1/YES////191
438
       22/18/1/YES////191
439
       22/19/1/YES////191
440
       22/20/1/YES////191
441
       24/1/1/10/8.5//183/0
442
       24/1/2/16/8.5//183/270
443
       24/1/3/10/8.5//183/180
444
       24/2/1/12/8.5//183/180
445
       24/3/1/12/8.5//183/180
446
       24/4/1/10/8.5//183/0
447
       24/4/2/16/8.5//183/90
448
       24/4/3/10/8.5//183/180
      24/5/1/11/8.25//183/0
449
450
      24/5/2/12/8.25//183/270
451
      24/6/1/12/8.25//183/270
452
      24/6/2/12/8.25//183/180
453
      24/7/1/11/8.25//183/0
454
      24/7/2/12/8.25//183/90
455
      24/8/1/12/8.25//183/90
456
      24/8/2/12/8.25//183/180
457
      24/9/1/11/8.5//183/0
458
      24/9/2/11/8.5//183/270
459
      24/12/1/11/8.5//183/0
460
      24/12/2/11/8.5//183/90
461
      24/13/1/5/8.5//183/270
462
      24/13/2/6/8.5//183/180
463
      24/14/1/5/8.5//183/90
464
      24/14/2/8/8.5//183/180
```

```
CONTENTS OF : E:\CB101-14.TM
LINE #
 465
       24/15/1/8/8.25//183/0
 466
       24/16/1/8/8.25//183/0
 467
       24/19/1/7/8.25//183/180
 468
       24/20/1/7/8.25//183/180
 469
       25/1/1/20/1/1/.81/.64
 470
       25/1/2/5/2.5/3/.81/.64
 471
       25/1/3/20/1/1/.81/.64
 472
       25/2/1/20/1/1/.81/.64
 473
       25/3/1/20/1/1/.81/.64
474
       25/4/1/20/1/1/.81/.64
475
       25/4/2/5/2.5/1/.81/.64
476
       25/4/3/20/1/1/.81/.64
 477
       25/5/1/4/2.5/1/.81/.64
478
       25/5/2/4/2.5/1/.81/.64
479
       25/6/1/4/2.5/1/.81/.64
480
       25/6/2/4/2.5/1/.81/.64
481
       25/7/1/4/2.5/1/.81/.64
482
       25/7/2/4/2.5/1/.81/.64
483
       25/8/1/4/2.5/1/.81/.64
484
       25/8/2/4/2.5/1/.81/.64
485
       25/9/1/5/2.5/1/.81/.64
       25/9/2/5/2.5/1/.81/.64
486
487
       25/12/1/5/2.5/1/.81/.64
488
       25/12/2/5/2.5/1/.81/.64
489
       25/13/1/3.5/1/1/.81/.64
490
       25/13/2/5/2.5/1/.81/.64
491
       25/14/1/3.5/1/1/.81/.64
492
       25/14/2/5/2.5/1/.81/.64
493
       25/15/1/4/2.5/1/.81/.64
494
       25/16/1/4/2.5/1/.81/.64
495
       25/19/1/4/2.5/1/.81/.64
496
       25/20/1/4/2.5/1/.81/.64
497
       26/M/CBLQP/CBLQL/CBLQCLG//OFF/CBLQCLG/OFF/OFF/OFF
498
       27/M/308/SF-PERS/230/190/.5/WATT-SF/INCAND
499
       29/1/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
500
       29/2/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
       29/3/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
501
       29/4/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
502
       29/5/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
503
504
       29/6/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
505
       29/7/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
506
      29/8/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
507
       29/9/////.19/CFM-SF
508
      29/10/////.19/CFM-SF
       29/11//////.19/CFM-SF
509
510
      29/12/////.19/CFM-SF
511
      29/13/////.19/CFM-SF
512
      29/14/////.19/CFM-SF
513
       29/15//////.19/CFM-SF
514
      29/16//////.19/CFM-SF
515
      29/17//////.19/CFM-SF
516
      29/18/////.19/CFM-SF
517
      29/19/////.19/CFM-SF
518
      29/20/////.19/CFM-SF
519
      SYSTEM - 4
520
      39/4/COMBINED ECOS
521
      40/1/PTAC
522
      41/1/1/1
```

```
CONTENTS OF : E:\CB101-14.TM
LINE #
523
524
      45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
525
      40/2/RAD
526
      41/2/1/2
      45/2/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF
527
528
      EQUIPMENT - 4
      59/4/CARLISLE///COMBINED ECOS
529
530
      60/1/1/PKPLANT/1/1
      62/1/EQ1161/6
531
532
      65/1/1//2/2
533
      67/1/EQ2102/1
534
      69/1/EQ4003
```

Building 101 (Typical for 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, and 114)

Trace Output File

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDINGS 101-114

Weather File Code: CARLISLE Location: EMERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (dea) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) 72 (F) Summer Design Wet Bulb: Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 Air Density: 0.0742 (Lbm/cuft) Air Specific Heat: 0.2444 (Stu/lbm/F) Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft) Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 10: 3:20 1/ 7/94

Dataset Name: CB101-14 .TM

AIRFLOW - ALTERNATIVE 1 BASE BUILDING

Chesign Airflow Quantities)

					Auxil.	Room		
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return - Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	PTAC	171	1,708	1,708	2,154	616	0	0
2	RAD	0	0	0	0	677	0	0
Totals		171	1.708	1.708	2.154	1.293	0	0

CAPACITY - ALTERNATIVE 1
BASE BUILDING

----- Cooling ------ Heating ------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) 
 4.3.
 0.0
 0.0
 4.3
 -77,491
 0
 0

 0.0
 0.0
 0.0
 -117,101
 0
 0

 4.3
 0.0
 0.0
 0.0
 -194,592
 0
 0
 1 PTAC 0 0 0 -77.491 2 RAD 0 0 0 -117.101 0 Totals 0 0 -194,592 0

The building peaked at hour 16 month 7 with a capacity of 4.3 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

------ ENGINEERING CHECKS-------ENGINEERING

			Percent		Cool:	ing		Heat			
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft	
1	Main	PTAC	10.00	1.15	394.9	342.6	35.03	1.15	-52.29	1,482	
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-47.49	2 466	

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

	t Time == Air ==>		Mo/Hr: DR/WR/HR:	7/16 91/ 73/ 98.	Λ				7/16 <sup>3</sup>				
0003100	nii/	U.N.	00/#0/IIK.	71/ /3/ 70.	V		*	נסטאנ		:	OADB:	4	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Space	Percnt *	Space Pe	ak Coil	Peak	Percnt
	S	ens.+Lat.	Sensible	e Latent	Total	0f Tot	* Sen	sible	Of Tot 1		ens Tot		Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	· (8tuh)	(%)	* (	3tuh)	(%) *		ıh) (l		(%)
		0	(	)	0	0.00		0	0.00			0	0.00
			C	)	0	0.00	*	0	0.00		0	0	0.00
		4,039	0	)	4,039	7.78	* ;	3,972	11.04	-3,4	110	3,410	4.41
Glass		9.125	C	)	9,125	17.58	* 1	1,195	31.10 *		0	0	0.00
Glass		2,726	C		2,726	5.25	*	2,404	6.68 *	-13,4	105 -1	3,405	17.34
		8.040	93	5	. 8,133			3,112	22.54 *	-29,0	186 -2	7,459	38.11
	ion	0			0	0.00			0.00 *		0	0	0.00
		0			0	0.00	*	0	0.00 *		0	0	0.00
		17,114			17.114	32.97	*	5,782	18.84 *		35 -3	1,035	40.14
Sub To	tal==>	41.044	93	;	41,138	79.25	* 32	2,465	90.20 *	-76,9	37 -7	7,310	100.00
Internal	Loads						*		*				
Lights		2,370	0	)	2,070	3.99	* '	2,078	5.77 *		0	0	0.00
People		1.784			1,784		*	884	2.46 *		0	0	0.00
Misc		Q.	0	0	0	0.00	*	0	0.00 *		0	0	0.00
		3,855	0	0	3,855	7.43	* /	2,962	8.23 *		0	0	0.00
					0	0.00	*	565	1.57 *	-5	24	0	0.00
		0	0	Ò	6,560	12.64	*	0	0.00 *		0	0	0.00
Sup. Fan	Heat				364	0.70	*		0.00 *			0	0.00
Ret. Fan			0	)	Û	0.00	*		0.00 *			0	0.00
Duct Hea			0		0				0.00 *			0	0.00
OV/UNDR	-	Ĵ			0			0	0.00 *		0	0	0.00
Exhaust			-7						0.00 *			0	0.00
Terminal	Bypass		0	0	0	0.00			0.00 *			0	0.00
							*		*				
Grand To	tal==>	44,951	35	- 0	51,910	100.00	* 35	,992	100.00 *	-77,4	61 -77	1,310	100.00
			000	LING COIL S	ELECTION						AREAS		
	Total	Capacity	Sens Cap.	Coil Airfl	Enteri	ng DB/WB/	HR Lea	ving	OB/WB/HR	Gross Tot	al Gla	ass (s	f) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De	g F Grai	ns Deg F	Deg :	F Grains	Floor		`	,,
Main Clg									4 59.0		0		
Aux Clg	0.0	0.0	0.0	0	0.0	0.0 0	0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	.0 0.0	0.0	0.0	Roof	922		0 0
Totals	4.3	51.9								₩all	1,592	7	250 16
	HEATIN	G COTE SELE	ECTION		AI	RELOWS (c	fm)		-ENGINEERING	CHECKS	TEMPER	2ΔΤΙΙ <b>Ω</b> Ε(	S (F)
		y Coil A:			Type	Cooling	Heating		lg % OA	10.0	Type	Clg	
	(Mbh)				Vent	171	nouving (		lg Cfm/Saft		SADB	_	6 109.7
Main Htg	-77.				Infil	446	446		lg Cfm/Ton		Plenum	75.2	
Aux Htg	0.		0 0.0		Supply	1,708	1,708		lg Saft/Ton		Return	75.0	
Preheat	-0.				Mincfm	0	2,100		lg Btuh/Sqft		Ret/OA	76.6	
Reheat	0.4		0 0.0		Return	1,708	1,708		o. People	5	Runarnd	75.0	
Humidif.	0.1	V	0 0.0	0.0	Exnaust	171	(	) H:	tq % UA	0.0	- Po Mtrii	) () (	() () ()
	0.: 0.:		0 0.0		Exhaust Rm Exh	17 <b>1</b> 0	(		tg % OA tg Cfm/SqFt		Fn MtrT( Fn BldT(		

System 2 Block RAD - RADIATION

Peaked a	t Time =		Mo/Hr:	0/0				*		/Hr:	0/0 >	<b>k</b>		r: 13/ 1	
Outside	Air ==>	04	DB/WB/HR:	0/ 0/	0.0			*	0	ADB:	•	k	OAD		
•		Space	Ret. Ai	r Ret. Ai	r	Net	Percnt	* *	S	pace	Percnt ?		nak C	oil Peak	Percnt
	4	Sens.+Lat.	Sensibl				Of Tot		Sens		Of Tot	· ·		Tot Sens	Of Tot
Envelope	Loads	(Stuh)	(Btuh				(%)		(8		(%)	,		(Btuh)	(%)
Skylit	e Solr	0				0	0.00		`	0	0.00	•	0	0	0.00
Skylit	e Cond	0		0		0	0.00			0	0.00		Ō	Ŏ	0.00
Roof C	ond	0		0		0	0.00			0	0.00		-	-5,156	4.40
Glass	Solar	0		Ú		ð	0.00	*		0	0.00		0	0	0.00
Glass	Cond	0		0		0	0.00	*		0	0.00		947		17.03
Wall Co	ond	0		0		0	0.00	*		0	0.00		846		38.31
Partit:	ion	0				0	0.00	*		0	0.00 *			0	0.00
Expose	d Floor	0				ŷ	0.00			0	0.00		0	0	0.00
Infilt	ration	J				9	0.00			0	0.00 *		-	-47,134	40.25
Sub To	tal::>	0		0		0	0.00			0	0.00			-117,101	100.00
Internal	Loads							*				-		,	200100
Lights		0		0		Û	0.00	*		0	0.00 *	:	0	0	0.00
People		0				0	0.00	*		0	0.00 \$		0	0	0.00
Misc		0		0	0	0	0.00	*		0	0.00 *		0	0	0.00
Sub Tot	tal==>	0		0	0	Û	0.00	*		0	0.00 *		0	0	0.00
Ceiling (	Load	0		0		0	0.00	*		0	0.00 *		342	0	0.00
Outside A	Air	0		0	0	0	0.00	*		0	0.00 *		0	0	0.00
Sup. Fan						0	0.00	*			0.00 *			0	0.00
Ret. Fan	Heat			0		0	0.00	*			0.00 *			0	0.00
Duct Head				0		0	0.00	*			0.00 *			0	0.00
OV/UNDR S	Sizing	Û				0	0.00	*		0	0.00 *		0	0	0.00
Exhaust H				0	0	0	0.00	*			0.00 *			0	0.00
Terminal	Bypass			0	0	0	0.00	*			0.00 *			0	0.00
								*			*				
Grand Tot	tal==>	0		0 - (	0	0	0.00	*		0	0.00 *	-121,	425	-117,101	100.00
			co	DLING COIL	SELECTION	<b>\</b>							AR	EAS	
	Total	Capacity	Sens Cap.	Coil Air	fl Ent	ering	D8/W8/H	HR	Leav	ing Da	3/WB/HR	Gross To		Glass (s	
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grain	ns	Deg F	Deg F	Grains	Floor			, (-,
ain Clg	0.0	0.0	0.0	(	0.0	0.0	0.	.0	0.0	0.0	0.0	Part			
ux Clg	0.0	0.0	0.0	(	0.0	0.0	0.	.0	0.0	0.0	0.0	ExFlr	0		
pt Vent	0.0	0.0	0.0	(	0.0	0.0	0.	.0	0.0	0.0	0.0	Roof	1,394		0 0
otals:	0.0	0.0										Wall	2,417		372 15
	HEATIN	G COIL SEL	ECTION			-AIRFL	.OWS (c1	fm)		{	NGINEERING	CHECKS	TFI	MPERATURE:	S (F)
	Capacit		irfl Ent	Lvg	Type		oling		eating		1 % OA	0.0	Ty		
	(Mbh)	(cf	m) Degi	Deg F	Vent		Õ		0		Cfm/Sqft	0.00	SADB	_	_
ain Htg	-117.		0 0.	0.0	Infil		0		677		Cfm/Ton		Plen		
ux Htg	0.		û 0.	0.0	Supply		0		0		Sqft/Ton	0.00	Retu		
reheat	0.		0 0.	0.0	Mincfm		0		0		Btuh/Sqft		Ret/		
eheat	0.		0 0.1	0.0	Return		0		0		People	0	Runa		
umidif	0.		0 0.	0.0	Exhaust		0		0		% OA	0.0	En M		
ot Vent	0.	0	0 0,0	0.0	Rm Exh		0		0		Cfm/SqFt		Fn B		
otal	-117.														

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

		Room U-Values(Btu/hr/sqft/F)										Room Capac.
Room				Summr	Wintr	a, 111 , 5 <b>q</b>	Summr	Wintr			Mass (lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof		Windo	Wall	Ceil.	sqft)	sqft/F)
1	TV ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	203.7	47.66
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	45.0	12.23
3	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	45.0	12.23
4	TV ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	224.4	52.22
5	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	158.6	37.76
6	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	
7	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	158.6	41.83
8	BEDROOM	0.000	0,000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	37.76
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	131.3	41.83
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549		31.54
1	TV ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343		131.3	31.54
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.000 0.549	203.7 45.0	47.66
3	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343			12.23
4	TV ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837		0.549	45.0	12.23
5	BEDROOM .	0.000	0.000	0.000	0.000	0.058	0.810		0.343	0.000	224.4	52.22
6	BEDROOM	0.000	0.000	0.000	0.000	0.058		0.837	0.343	0.000	158.6	37.76
7	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	41.83
8	BEDROOM	0.000	0.000	0.000	0.000		0.810	0.837	0.343	0.000	158.6	37.76
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	41.83
9	DINING ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	131.3	31.54
10	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	151.3	35.58
11,	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
12	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
13	REAR FOYER	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	151.3	35.58
14	REAR FOYER	0.000	0.000	0.000		0.058	0.810	0.837	0.343	0.000	332.9	73.43
15	8EDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	401.2	88.44
16	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	107.2	26.46
17	HALL	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	107.2	26.46
18.	HALL					0.058	0.000	0.000	0.000	0.000	14.3	6.08
19	BATH	0.000	0.000	0.000	0.000	0.058	0.000	0.000	0.000	0.000	14.3	6.08
	BATH	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	133.8	32.31
		0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	133.8	32.31
Zone System	2 Total/Ave. 2 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	105.4	25.59
System	,	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	120.9	29.17
Buildin	y	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	124.8	30.06

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

------ BUILDING AREAS ------

											٠.		
				£1 ··	Y.1.1								
		Mara la		Floor Area/Dupl	Total	n	Exposed	61	<b>61.3</b>				
Room			er of icate	Room	Floor	Partition	Floor	Skylight		Net Roof	Window	Win	Net Wall
Number	Description	Flr			Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
MUMBEL	vescription	111	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(\$)	(sqft)
1	TV ROOM	1	1	160	160	. 0	0	0	0	160	78	25	228
2	LIVING ROOM	1	1	280	280	0	. 0	0	0	0	20	20	82
3	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
4	TV ROOM	1	1	160	160	0	0	0	0	160	53	17	253
5	8EDROOM	1	1	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	1	1	145	145	0	0	0	0	145	. 20	10	178
7	8EDROOM	1	1	156	156	0	0	0	0	156	20	11	170
8	8EDROOM	1	1	145	145	0	0	0	0	145	20	10	178
Zone	1 Total/Ave.				1,482	0	0	0	0	922	250	16	1,342
System	<pre>1 Total/Ave.</pre>				1,482	0	0	0	0	922	250	16	1,342
1,	TV ROOM	1	1	160	160	0	0	0	0	160	78	25	228
2	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
3	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
4	TV ROOM	1	1	160	160	0	0	0	0	160	53	17	253
5	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	1	1	145	145.	0	0	0	0	145	20	10	178
7	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
8	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
Zone	<pre>1 Total/Ave.</pre>				1,482	0	0	0	0	922	250	16	1,342
9	DINING ROOM	1	1	148	. 148	0	0	0	0	0	25	13	162
10	KITCHEN	1	1	108	. 108	0	0	0	0	0	0	0	0
11	KITCHEN	1	1	108	108	0	0	0	0	0	0	0	0
12	DINING ROOM	1	1	148	148	0	0	0	0	0	25	13	162
13	REAR FOYER	1	1	33	33	0	0	0	0	33	16	17	78
14	REAR FOYER	1	1	33	33	0	0	0	0	33	16	14	94
15	BEDROOM	1	1	80	80	0	0	0	0	80	10	15	56
16	BEDROOM	1	1	80	. 80	0	0	0	0	80	10	15	56
17	HALL	1	1	70	70	0	0	0	0	70	0	0	0
18	HALL	1	1	70	70	0	0	0	0	70	0	0	0
19	BATH	1	1	53	53	0	0	0	0	53	10	17	48
20	BATH	1	1	53	53	0	0	0	. 0	53	10	17	48
Zone .	<pre>2 Total/Ave.</pre>				984	0	0	0	0	472	122	15	703
System	<pre>2 Total/Ave.</pre>		•		2,466	. 0	. 0	0	0	1,394	372	15	2,045
Buildin	g				3,948	0	0	0	0	2,316	622	16-	3,387

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ASHRAE 90 ANALYSIS - ALTERNATIVE 1 BASE BUILDING

------ASHRAE 90 ANALYSIS------

Overall Roof U-Value = 0.058 (Btu/Hr/Sq Ft/F) Overall Wall U-Value = 0.416 (Btu/Hr/Sq Ft/F) Overall Building U-Value = 0.285 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.58 (8tu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 16.39 (8tu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1 BASE BUILDING

SYSTEM LOAD PROFILE-----

## System Totals

Percent Design Load	Coo: Cap. (Ton)	ling Loa Hours (%)	ad Hours	Capacity (Btuh)	Load Hours (%)		Cooling Cap. (Cfm)		Hours	Heating Cap. (Cfm)	Airflo Hours (%)	Hours
0 - 5 5 - 10	0.2 0.4	11 15	154 220	-9,730	8	375	85.4	0	0	0.0		_
10 - 15	0.6	10		-19,459	13	614	170.8	0	Ö	0.0	0	•
15 - 20	0.9	6	143	-29,189	16	747	256.2	0	Ŏ	0.0	0	
20 - 25	1.1	8	89	-38,918	20	898	341.6	42	1,530		0	0
25 - 30	1.3	11	118	-48,648	22	993	427.0	0	0	0.0	0	0
30 - 35	1.5	9	154	-58,378	18	830	512.4	0	0	0.0	0	0
35 - 40	1.7	13	134	-68,107	2	94	597.8	0	Ō		0	0
40 - 45	1.9	5	191	-77,837	0	0	683.3	Ō	Ö	0.0	0	0
45 - 50	2.2	7	66	-87,566	0	0	768.7	0	Ŏ	0.0 0.0	0	0
50 - 55	2.4	3	42	-97,296	0	0	854.1	21	765	0.0	0	0
55 - 60	2.6	3	42	-107,026	0	0	939.5	0	0	0.0	V	0
60 - 65	2.8	0	40	-116,755	0	0	1,024.9	Ō	ŏ	0.0	. 0	0
65 - 70	3.0	٥	0	-126,485	0	0	1,110.3	Ō	Õ		0	0
70 - 75	3.2	0	0	-136,215	0	0	1,195.7	Ō	Ö	0.0	0	0
75 - 80	3.5	٥	0	-145,944	0.	0	1,281.1	Ö	Ö	0.0 0.0	V	0
80 - 85	3.7	0	0	-155,674	0	0	1,366.5	0	0	0.0	. 0	0
85 - 90	3.9	1	0	-165,403	0	0	1,451.9	Ò	Ŏ	0.0	0	0
90 - 95	4.1	1	20	-175,133	0	0	1,537.3	0	0	0.0	0	0
95 - 100	4.3	7	11	-184,863	0	0	1,622.7	0	Õ		0	0
Hours Dff	0.0	0 7	0	-194,592	0	0	1,708.1	-	1,377	0.0	0	0
	V.V	v /	,336	0	0 4	1,209	0.0		5,088	0.0 0.0	0	0 8,760

Mo./Hr.

Day Type

2 10 2 8 1 1

5

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1 BASE BUILDING

:				BUILDING TEMPERATURE PROFILES
Temperature				Zone Number
Range (F)	. 1	1	2	
Max. Temp.	79.2	92.9	91.8	
Mo./Hr.	7 14	8 22	8 23	
Day Type	1			
. '				Number of Hours
Above 100	0	0	0	
95 - 100	0	0	0	
90 - 95	0	1,164		
85 - 90			1,332	
80 - 85	Ö		1,007	
75 - 80	2,898			
70 - 75	837			
	471			
60 - 65	354			
55 - 60	1,362			
50 - 55	478			
Below 50	2,360		0	
Min. Temp.	37.6	67.9	68.0	·

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1

BASE BUILDING

- M	0	N	T	Н	L '	Y	E	N	Ε	R	G	Υ	C	0	N	S	U	М	р	T	T	U	N	
-----	---	---	---	---	-----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--

	ELEC Off Peak	DEMAND On Peak	HOT WTR I On Peak	OT W DMND On Peak
Month	(k₩h)	(kW)	(Therm)	(Thrm/hr)
Jan	524	2	361	1
Feb	474	2	353	1
March	537	2	231	0
April	505	2	93	0
May	621	2	0	0
June	1,132	9	0	0
July	2,019	9	0	0
Aug -	1,233	9	0	0
Sept	592	8	. 0	0
Oct	529	2	24	0
Nov	505	2	157	0
Dec	518	2	305	1
Total	9,190	9	1,525	1

Building Energy Consumption = Source Energy Consumption = 46,563 (8tu/Sq Ft/Year) 75,327 (Btu/Sq Ft/Year)

Floor Area = 3,948 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- EQUIPMENT ENERGY CONSUMPTION------

	Equip -							umption						•
IM	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS													
	ELEC	522	472	535	503	529	516	516	535	503	529	503	516	6,181
	PK	2.0	2.0	2.0	2.0	2.0	_ 2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
1	MISC LD													:
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	s (
	PK	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD												•	
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	(
	PX	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	. 0	0	0	0	0	0	0 .	(
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P' HOTH20	0	0	0	0.0	0.0	0 0.0	0 0.0	0 0.0	0	0	0	0	(
	PK	0.0	0.0	0.0	0.0	. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P' CHILL	0	0	0	0	0	0	0	0	0	0	0	0	(
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161		AIR-	CLD COND	COMP <1	5 TONS								
	ELEC	0	0	0	0	0	395	1086	451	0	0	0	0	1,932
	PK	0.0	0.0	0.0	0.0	0.0	5.8	. 6.0	5.8	5.6	0.0	0.0	0.0	6.0
1	EQ5200		COND	ENSER FAI	NS									
	ELEC	0	0	0	0	0	41	108	46	0	0	0	0	195
	PK	0.0	0.0	0.0	0.0	0.0	0.4	0.6	0.6	0.3	0.0	0.0	0.0	0.6
1	EQ5303		CONTI	ROLS										•
	ELEC	0	0	0	0	0	91	217	109	0	0	0	0	417
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003		FC CI	ENTRIF. I	FAN C.V.									
	ELEC	0	0	0	0	92	89	92	92	89	0	0	0	453
	PK	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.2
1	EQ2102		PURCI	HASED DIS	ST. HOT	#ATER								
	P HOTH20	361	353	231	93	0	0	0	0	0	24	157	305	1,525
	PK	0.6	0.6	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.5	0.6

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0.0

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

. . . . .

ELEC 2 2 2 2 0 0 0 0 1 2 PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

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HITTI TTY DEAK CHECKSIMS - ALTERNATIVE 1

Miscellaneous

Lights Base Utilities

Misc Equipment Sub Total

Grand Total

UTILITY BASE BUI	LDING	- ALTERNATIVE 1				
Utility	ELECTRIC DEM		UTILITY PEA	K CHEC	K S U M S	
	ue 9.0 ime of Peak 1	(kW) 6 (hr) 7 (mo)				
Hour 16	Month 7					
	Equipment Code Name	1	Equipment Description		Of Tot	
Cooling (	Equipment					
1	EQ1161	AIR-CLD COND COMP	(15 TONS	6.8	75.71	
Sub Total	1			6.8	75.71	
Sub Total	1			0.0	0.00	
Air Movin	ng Equipment					
1		SUMMATION OF FAN EL	ECTRICAL DEMAND	0.2	2.43	
Sub Total	l		•	0.2	2.43	
Sub Total	l			0.0	0.00	

2.0

0.0

0.0

21.86

0.00

0.00 2.0 21.86

9.0 100.00

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDINGS 101-114

Dataset Name:

Weather File Code:	CARLIS	LE
Location:	ENERGY	SAVINGS OPPORTUNITY STUDY
Latitude:	40.2	(deg)
¡Longitude:	77.2	(deg)
Time Zone:	5	
Elevation:	475	(ft)
Barometric Pressure:	29.2	(in. Hg)
Summer Clearness Number:	1.00	
Winter Clearness Number:	1.00	
Summer Design Dry Bulb:	92	(F)
Summer Design Wet Bulb:	72	(F)
Winter Design Dry Bulb:	4	(F)
Summer Ground Relectance:	0.20	
Winter Ground Relectance:	0.20	
Air Density:	0.0742	(Lbm/cuft)
Air Specific Heat:		(Btu/lbm/F)
Density-Specific Heat Prod:	1.0882	(Btu-min./hr/cuft/F)
Latent Heat Factor:	4,790.2	(Btu-min./hr/cuft)
Enthalpy Factor:	4.4519	(Lb-min./hr/cuft)
Design Simulation Period: May	To S	September
System Simulation Period: Jan	uary To (	December
Cooling Load Methodology:		
Time/Date Program was Run:	10:22:58	3 1/ 7/94

CB101-14 .TM

AIRFLOW - ALTERNATIVE 2 WALL & ROOF INSULATION

------ SYSTEM SUMMARY ------ (Design Airflow Quantities)

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
i'	PTAC	120	1,199	1,199	1,565	486	0	0
2	RAD	0	0	0	_ 0	556	0	0
Totals		120	1,199	1,199	1,565	1,042	0	0

CAPACITY - ALTERNATIVE 2
WALL & ROOF INSULATION

(Design Capacity Quantities)

			Cool	ling					Heating			
System Number	System Type	-	Aux. Sys. Capacity (Tons)		Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (8tuh)	Heating Totals (Btuh)
1.	PTAC	3.1	0.0	0.0	3.1	-45,492	0	0	0	0	0	-45,492
2	RAD	0.0	0.0	0.0	0.0	-68,640	0	0	0	0	. 0	-68,640
Totals		3.1	0.0	0.0	3.1	-114,133	0	0	0	0	0	-114,133

The building peaked at hour 16 month 7 with a capacity of 3.1 tons

ENGINEERING CHECKS - ALTERNATIVE 2
WALL & ROOF INSULATION

------ ENGINEERING CHECKS-------ENGINEERING

		Percent	**	Cool:	ing		Heat			
System	Main/	System	Outside	Cfm/ ·	Cfm/	Sq Ft	Btuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	PTAC	10.00	0.81	382.4	472.5	25.40	0.81	-30.70	1,482
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-27.83	2,466

System	1	Peak	PTAC	- PACKAGED	TERMINAL A	AIR COND.						
					*****	*******				***** HEATI		
	at Time		Mo/Hr: 7	•				/Hr: 7	•		Mo/Hr: 13/	1
Outside	e Air ==>	0A	DB/WB/HR: S	91/ 73/ 98.0	)		k 0	ADB: 9	91 *		OAD8: 4	
							<b>k</b>		*			•
		Space		Ret. Air		Percnt		pace	Percnt *	*	Coil Pe	ak Percnt
		Sens.+Lat.	Sensible	Latent	Total				Of Tot *	•		
	oe Loads	(8tuh)	(Btuh)	(Btuh)	(Btuh)	(%)	-	tuh)	(%) *	(8tuh)	(Btu	h) ( <b>\$</b> )
-	ite Solr	0	0		0	0.00	k	0	0.00 *	0		0.00
-	ite Cond	0	0		0	0.00	ķ .	0	0.00 *	0		0.00
Roof	Cond	1,644	0		1,644	4.37	<sup>‡</sup> 1	,695	6.65 *	-1,582	-1,5	82 3.48
	s Solar	9,125	0		9,125	24.24	11	,195	43.93 *	0		0.00
Glass	s Cond	2,726	0		2,726	7.24	¢ 2	,404	9.43 *	-13,405	-13,4	05 29.49
Wall	Cond	1,354	16		1,369	3.64	1	,341	5.26 *	-4,913	-4,9	76 10.95
Parti	ition	0			0	0.00	ŧ	0	0.00 *	0		0.00
Expos	sed Floor	0			0	0.00	ķ .	0	0.00 *	0		0.00
Infil	ltration	14,058			14,058	37.35	\$ 5	,571	21.86 *	-25,493	-25,4	93 <b>56.08</b>
	「otal==>	28,907	16		28,923	76.84	22	,206	87.13 *	-45,393	-45,4	57 100.00
Interna	al Loads						ķ .		*			
Light	ts	2,070	0		2,070	5.50	2	,078	8.15 *	0		0.00
Peopl	le	1,784			1,784	4.74	ţ.	884	3.47 *	0		0.00
Misc		0	0	0	0	0.00	ķ .	0	0.00 *	0		0.00
Sub T	(otal==>	3,855	0	0	3,855	10.24	2	,962	11.62 *	0		0.00
Ceiling	, Load	10	-10		0	0.00	t .	318	1.25 *	-309		0.00
Outside	e Air	0	0	0	4,606	12.24	<b>k</b>	0	0.00 *	0		0 0.00
Sup. Fa	an Heat				256	0.68	¢ .		0.00 *			0.00
Ret. Fa	an Heat		0		. 0	0.00	t .		0.00 *		•	0.00
Duct He	at Pkup		0		0	0.00	ķ.		0.00 *			0.00
OV/UNDR	RSizing	0			0	0.00	t .	0	0.00 *	0		0.00
Exhaust	Heat		-1	0	-1	-0.00	¢ .		0.00 *			0.00
Termina	al Bypass		0	0	0	0.00	ķ		0.00 *			0 0.00
l l					,	;	ķ .		*			
Grand T	otal==>	32,771	5	0	37,638	100.00	25	,486	100.00 *	<b>-4</b> 5,702	-45,4	57 100.00
			C00L	.ING COIL SE	LECTION						AREAS	
1	Total	l Capacity	Sens Cap.	Coil Airfl	Enterin	ng DB/WB/H	≀ Lea	ving D8	3/WB/HR	Gross Total	Glass	(sf) (%)
1	(Tons)	) <b>(</b> Mbh)	(Mbh)	(cfm)							,482	. , , ,
Main Clg		37.6	26.3	1,199				53.4			0	
Aux Clg		0.0	0.0	0	0.0	0.0		0.0			0	
Opt Vent		0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Roof	922	0 0
Totals	3.1	37.6				•				Wall i		
		ING COIL SEL			AIF	RFLOWS (cfi	1)		ENGINEERING		TEMPERAT	URES (F)
		ity Coil A			Type ·				3 % OA			Clg Htg
		h) (cf	m) Deg F		Vent	120	0		; Cfm/Sqft			55.5 103.0
Main Htg			199 68.2	103.0	Infil	366	366	Clg	cfm/Ton			75.0 67.8
Aux Htg	j (	0.0	0.0	0.0	Supply	1,199	1,199	Clg	3 Sqft/Ton			75.0 68.0
Preheat	-(	0.0 1,	199 61.6		Mincfm	0	0	Clg	g Btuh/Sqft	25.40		76.6 68.0
Reheat	(	0.0	0.0		Return		1,199	No.	. People	5		75.0 68.0
Humidif			0 0.0		Exhaust	120	. 0	Htg	People 3 % OA 4 Cfm/SqFt	0.0		0.0 0.0
Opt Vent		0.0	0.0		Rm Exh	0	0	Htg	; Cfm/SqFt	0.81		0.0 0.0
Total	-45	5.5			Auxil	0	0	Htg	g Btuh/SqFt	-30.70	Fn Frict	0.1 0.0

System 2 Block RAD - RADIATION

Sens.+Lat.   Sensible   Latent   Total   Of Tot   *   Sensible   Of Tot   *   Sp.	Mo/Hr: 13/ OADB: 4 ace Peak Coil Pe ace Sens Tot Se (Btuh) (Btu 0 0	4 eak Percnt ens Of Tot
Space	ace Peak Coil Pe ace Sens Tot Se (Btuh) (Btu O	eak Percnt ens Of Tot
Space	ace Sens Tot Se (Btuh) (Btu 0 0	ens Of Tot
Sens.+Lat.   Sensible   Latent   Total   Of Tot   *   Sensible   Of Tot   *   Sp.	ace Sens Tot Se (Btuh) (Btu 0 0	ens Of Tot
Skylite Solr       0       0       0       0.00 *       0.00 *         Skylite Cond       0       0       0.00 *       0.00 *       0.00 *         Roof Cond       0       0       0.00 *       0.00 *       0.00 *         Glass Solar       0       0       0.00 *       0.00 *       0.00 *         Glass Cond       0       0       0.00 *       0.00 *       0.00 *         Wall Cond       0       0       0.00 *       0.00 *       0.00 *         Partition       0       0.00 *       0.00 *       0.00 *	0 0	uh) (%)
Skylite Cond       0       0       0       0.00 *       0       0.00 *         Roof Cond       0       0       0       0.00 *       0       0.00 *         Glass Solar       0       0       0       0.00 *       0.00 *         Glass Cond       0       0       0.00 *       0.00 *         Wall Cond       0       0       0.00 *       0.00 *         Partition       0       0.00 *       0.00 *       0.00 *	0 0	, \ 1.0 /
Skylite Cond       0       0       0       0.00 *       0.00 *         Roof Cond       0       0       0       0.00 *       0.00 *         Glass Solar       0       0       0       0.00 *       0.00 *         Glass Cond       0       0       0.00 *       0.00 *         Wall Cond       0       0       0.00 *       0.00 *         Partition       0       0.00 *       0.00 *       0.00 *		0.00
Glass Solar 0 0 0 0.00 * 0 0.00 * Glass Cond 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 700 0 7	0 0.00
Glass Solar 0 0 0 0.00 * 0 0.00 * Glass Cond 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-2,392 -2,3	392 3.48
Glass Cond       0       0       0       0.00 *       0       0.00 *         Wall Cond       0       0       0.00 *       0       0.00 *       0.00 *         Partition       0       0.00 *       0.00 *       0.00 *       0.00 *	0	
Wall Cond 0 0 0 0.00 * 0 0.00 * Partition 0 0.00 *	-19,947 -19,9	
Partition 0 0.00 * 0 0.00 *	-7,405 -7,5	
	0	0 0.00
Exposed Floor 0 0.00 * 0 0.00 *	0	0 0.00
Infiltration 0 0.00 * 0 0.00 *	-38,717 -38,7	
Sub Total==> 0 0 · 0 0.00 * 0 0.00 *	-68,461 -68,6	
Internal Loads * *	10,.01	100.00
Lights 0 0 0 0.00 * 0 0.00 *	0	0 0.00
People 0 0.00 * 0 0.00 *	Ŏ	0 0.00
Misc 0 0 0 0 0.00 * 0 0.00 *	Ŏ	0 0.00
Sub_Total==> 0 0 0 0.00 * 0 0.00 *	0	0 0.00
Ceiling Load 0 0 0 0.00 * 0 0.00 *	-2,408	0 0.00
Outside Air 0 0 0 0 0.00 * 0 0.00 *	0	0 0.00
Sup. Fan Heat 0 0.00 * 0.00 *	V	0 0.00
Ret. Fan Heat 0 0.00 * 0.00 *		0 0.00
Duct Heat Pkup 0 0.00 * 0.00 *		0 0.00
OY/UNDR Sizing	0	0 0.00
Exhaus,t Heat 0 0 0 0.00 * 0.00 *	V	0 0.00
Terminal Bypass 0 0 0 0.00 * 0.00 *		0 0.00
* * *		0 0.00
	-70,869 -68,6	640 100.00
COOLING COIL SELECTION		
Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gros		s (sf) (%)
	r 2,466	
	0	
Aux Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 ExFli		
	1,394	0 (
Totals 0.0 0.0 Wall	2,417	372 15
	KSΤΕΜΡΕΩΔΤ	TURES (F)
		Clg Htg
, , , , , , , , , , , , , , , , , , , ,	0.00 SADB	0.0 68.1
	0.00 Plenum	0.0 67.7
	0.00 Return	0.0 68.0
	0.00 Ret/OA	0.0 68.0
• • • • • • • • • • • • • • • • • • • •	'	
Humidif 0.0 0 0.0 0.0 Exhaust 0 0 Htg % OA		0.0 68.0
		0.0 0.0
·		
·	0.00 Fn BldTD 7.83 Fn Frict	0.0 0.0

BUILDING U-VALUES - ALTERNATIVE 2 WALL & ROOF INSULATION

ķ

------ BUILDING U-VALUES------

				-	0	11 11 1						_
						om U-Val					Room	Room
Room				C		ı/hr/sqt		W			Mass	Capac.
Number	Description	Dar+	Evel n	Summr	Wintr	Doof	Summr	Wintr	Nall	0-31	(lb/	(8tu/
Number	DESCLIDITION	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	208.2	48.56
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	45.7	12.37
3	LIVING ROOM	0.000	0.000	0.000	0.000.	0.000	0.810	0.837	0.058	0.549	45.7	12.37
4	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	229.3	53.18
5	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
6	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
7	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
8	BEDROOM	0.000	ù.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	134.1	32.10
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	134.1	32.10
1	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	208.2	48.56
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	45.7	12.37
3	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	45.7	12.37
4	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	229.3	53.18
5	BEDROOM .	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
6	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
7	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
8	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	134.1	32.10
9	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	154.0	36.11
10	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
11	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
12	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	154.0	36.11
13	REAR FOYER	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	339.6	74.77
14	REAR FOYER	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	409.2	90.02
15	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	109.9	27.00
16	BEDROOM	0.000	0.000	0.000	0.000	0.027	018.0	0.837	0.058	0.000	109.9	27.00
17	HALL	0.000	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.000	15.3	6.28
18.	HALL	0.000	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.000	15.3	6.28
19	BATH	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	137.0	32.95
20	BATH	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	137.0	32.95
Ione	2 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	107.6	26.03
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	123.5	29.68
Buildin		0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	127.5	30.59
												<del></del>

BUILDING AREAS - ALTERNATIVE 2 WALL & ROOF INSULATION

				•									
				Floor	Total		Exposed						
			er of	Area/Dupl	Floor	Partition	Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room			icate	Room	Area	Area	Area	Area	/Rf	Area	Area	/₩1	Area
Number	Description	Flr	Яm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	TV ROOM	1	1	160	160	0	0	0	0	160	78	25	228
2	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
3	LIVING ROOM	1	1	280	. 280	0	0	0	0	0	20	20	82
4	TV ROOM	1	1	160	160	0	0	0	0	160	53	17	253
5	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	1	i	145	145	0	0	0	0	145	20	10	178
7	BEDROOM	1	ì	156	156	0	0	0	0	156	20	11	170
8	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
Zone	<pre>1 Total/Ave.</pre>				1.482	0	0	0	0	922	250	16	1,342
System	<pre>1 Total/Ave.</pre>				1.482	0	0	0	0	922	250	16	1,342
1	TV ROOM	1	l	160	160	0	0	0	0	160	78	25	228
2	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
3	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
4	TV ROOM	1	1	160	160	i)	0	0	0	160	53	17	253
5	BEDROOM	- 1	ì	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	l	1	145	145	0	0	0	0	145	20	10	178
7	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
8	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
Zone	<pre>1 Total/Ave.</pre>				1,482	0	0	0	0	922	250	16	1,342
9	DINING ROOM	1	1	148	148	0	0	0	0	0	25	13	162
10	KITCHEN	1	1	108	108	0	0	0	0	0	0	0	0
11	KITCHEN	1	1	108	108	0	0	0	0	0	0	0	0
12	DINING ROOM	1	1	148	148	0	0	0	0	0	25	13	162
13	REAR FOYER	1	1	33	33	0	0	0	0	33	16	17	78
14	REAR FOYER	1	1	33	33	0	0	0	0	33	16	14	94
15	BEDROOM	1	1	80	80	0	0	0	0	80	10	15	56
16	8EDROOM	1	1	80	08	0	0	0	0	80	10	15	56
17	HALL	1	1	70	70	0	0	0	0	70	0	0	0
18:	HALL	1	i	70	70	0	0	0	0	70	0	0	0
19	BATH	1	1	53	53	0	0	0	0	53	10	17	48
20	BATH	1	1	53	53	0	0	0	0	53	10	17	48
Zone	<pre>2 Total/Ave.</pre>				984	0	0	0	0	472	122	15	703
System	<pre>2 Total/Ave.</pre>				2,466	0	0	0	0	1,394	372	15	2,045
Buildin	g				3,948	0 .	0	0	0	2,316	622	16	3,387

ASHRAE 90 ANALYSIS - ALTERNATIVE 2 WALL & ROOF INSULATION

------ ASHRAE 90 ANALYSIS------

Overall Roof U-Value = 0.027 (8tu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.175 (8tu/Hr/Sq Ft/F)
Overall Building U-Value = 0.121 (8tu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.35 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 15.01 (Btu/Hr/Sq Ft) SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 WALL & ROOF INSULATION

## System Totals .

Percent	Cool	ing Loa	ıd	Heatir	ng Load		Cooling	Airflow		Heating	Airflow	
Design Load	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap.	Hours (%)	Hours
0 - 5	0.2	. 13	140	-5,707	7	292	60.0	. 0	0	0.0	0	. 0
5 - 10	0.3	8	84	-11,413	. 12	472	119.9	0	0	0.0	0	0
10 - 15	0.5	7	81	-17,120	19	751	179.9	0	0	0.0	0	0
15 - 20	0.6	4	41	-22,827	24	930	239.9	42	1,530	0.0	0	0
20 - 25	0.8	7	79	-28,533	17	685	299.8	0	0	0.0	0	0
25 - 30	0.9	17	188	-34,240	18	692	359.8	0	0	0.0	0	0
30 - 35	1.1	5	58	-39,946	2	94	419.8	0	0	0.0	0	0
35 - 40	1.3	6	72	-45,653	0	0	479.8	0	0	0.0	Ô	0
40 - 45	1.4	8	94	-51,360	0	0	539.7	0	0	0.0	0	Ô
45 - 50	1.6	13	143	-57,066	0	0	599.7	21	765	0.0	0	0
50 - 55	1.7	5	54	-62,773	0	0	659.7	0	0	0.0	0	ň
55 - 60	1.9	0	0	-68,480	0	0	719.6	0	Ŏ	0.0	Ô	٥
60 - 65	2.0	5	51	-74,186	0	0	779.6	0	0	0.0	n	ň
65 - 70	2.2	. 0	0	-79,893	0	0	839.6	0	0	0.0	0	ň
70 - 75	2.4	0	0	-85,599	0	0	899.5	Ô	0	0.0	ň	٨
75 - 80	2.5	0	0	-91,306	0	0	959.5	Ô	٥	0.0	0	۸
80 - 85	2.7	0	0	-97,013	0	0	1,019.5	0	Ô	0.0	0	۸
85 - 90	2.8	0	0	-102,719	0	0	1,079.4	0	0	0.0	0	۸
90 - 95	3.0	0	0	-108,426	0	0	1,139.4	0	Ô	0.0	^	0
95 - 100	3.1	3	31	-114,133	0	Ō	1,199.4	38	1,377	0.0	0	٨
Hours Off	0.0	0	7,644	- 0	0	4,844	0.0	0	5,088	0.0	0	8,760

Min. Temp.

Mo./Hr.

Day Type

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 WALL & ROOF INSULATION

40.5 68.0 67.9

2 11 1 1 11 6

1

5

		BUILDING TEMPERATURE PROFILES	
			¥
Temperature		Zone Number	
Range (F)	1 1 2		4. ** **
Max. Temp.	78.8 95.6 94.9		4.
Mo./Hr.	7 14 9 21 9 20		
Day Type	1 1 1		
	•	Number of Hours	ta ja e
Above 100	0 0 0		
95 - 100	0 307 0		
	0 307 0		
90 - 95	0 1,901 1,983		e de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya del companya de la companya del companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la co
90 - 95 85 - 90			
	0 1,901 1,983		
85 - 90	0 1,901 1,983 0 221 370		
85 - 90 80 - 85	0 1,901 1,983 0 221 370 0 915 995		
85 - 90 80 - 85 75 - 80	0 1,901 1,983 0 221 370 0 915 995 2,928 379 378		
85 - 90 80 - 85 75 - 80 70 - 75	0 1,901 1,983 0 221 370 0 915 995 2,928 379 378 771 693 690		
85 - 90 80 - 85 75 - 80 70 - 75 65 - 70 60 - 65 55 - 60	0 1,901 1,983 0 221 370 0 915 995 2,928 379 378 771 693 690 797 4,344 4,344		
85 - 90 80 - 85 75 - 80 70 - 75 65 - 70 60 - 65	0 1,901 1,983 0 221 370 0 915 995 2,928 379 378 771 693 690 797 4,344 4,344 612 0 0		

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2

WALL & ROOF INSULATION

- M	0	N	Ī	Н	L'	Y	Ε	N	Ε	R	G	Υ	C	0	N	S	-t	J	ρ	T	T	Ω	N	
-----	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	----	---	---	---	---	---	---	--

	ELEC Off Peak	DEMAND On Peak	HOT_WTR On Peak	HOT W DMND On Peak
Month	(kWh)	(k₩)	(Therm)	(Thrm/hr)
Jan	523	2	193	0
Feb	473	2	194	. 0
March	537	2	122	0.
April	. 504	2	38	0
May	593	2	0	0
June	979	7	- 0	0
July	1,508	7	0	0
Aug	1,066	7	0	0
Sept	566	7	0	0
Oct	529	2	0	0
Nov	504	2	64	0
Dec	517	2	158	0
Total	8,300	7	769	0

Building Energy Consumption = 26,662 (Btu/Sq Ft/Year) 47,509 (Btu/Sq Ft/Year) Source Energy Consumption =

Floor Area = 3,948 (Sq Ft)

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

------EQUIPMENT ENERGY CONSUMPTION------

let Ium	Equip :	Jan	Feb	Mar	Apr	· Mon May	thly Cons June	umption July	Aug	Sep	0ct	Nov	Dec	Total
0	LIGHTS													
•	ELEC	522	472	535	503	. 529	516	516	535	503	529	507	E1/	
	PK	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	503 2.0	516 2.0	6,181 2.0
i	MISC LD													· ·
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0 0.0	0	0	0	.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD	٨	•											
	OIL PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0
ı	MISC LD									•••	•••	0.0	0.0	۷.0
7	P STEAM	0	0	0	0	٥	۸	۸	۸		•		Ā	_
	PK	0.0	0.0	0.0	0.0	0 0.0	0.0	0 0.0	0.0	0.0	0 0.0	0 0.0	0.0	0 0.0
,	MISC LD													
	P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0 0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD				•									
	P CHILL	0	0	0	0 .	0	0	0	0	0	0	0	0	0
	PK :	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	EQ1161			CLD COND										
	ELEC	0	0	0	0	0	292	702	347	0	0	0	0	1,341
	PK	0.0	0.0	0.0	0.0	0.0	4.0	4.3	4.2	4.1	0.0	0.0	0.0	4.3
	ED5200 ELEC	۸		ENSER FAI		•	7.0	<b>-</b> .						
	PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	30 0.2	71 0.4	36 0.4	0 0.2	0 0.0	0 0.0	0 0.0	137 0.4
	EQ5303		00077						•••	***	***	•••	0.0	0.4
	ELEC	0	CONTR		۸	۸	70	155	0.4	_	_			
	PK	0.0	0 0.0	0 0.0	0 0.0	0 0.0	79 0.3	155 0.3	84 0.3	0 0.3	0 0.0	0 0.0	0 0.0	317 0.3
	EQ4003		FC CF	ENTRIF. F	AN C V									
	ELEC	0	0	0	0	64	62	64	64	62	0	0	0	318
	PĶ	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.2
	EQ2102		PURCH	ASED DIS	ST. HOT W	IATER								
	P HOTH20	193	194	122	38	0	0	0	0	0	0	64	158	769
	PK	0.4	0.4	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4
	EQ5020		HEAT	WATER CI	RC. PUMP	C.V.						•		

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2

WALL & ROOF INSULATION

ELEC 1 PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

0.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2 WALL & ROOF INSULATION

 UTILITY	PEAK	CHECKSUMS	

7.2 100.00

Utility	ELECTRIC	DEMAND
---------	----------	--------

Peak Value 7.2 (kW)
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

**Grand Total** 

Eqp. Ref. Num.	Equipment Code Name uipment	Utilit Deman Equipment Description (kM	
1	EQ1161	AIR-CLD COND COMP <15 TONS 5.	0 70.31
Sub Total		5.	0 70.31
Sub Total		0.	0.00
Air Moving	Equipment		
1		SUMMATION OF FAN ELECTRICAL DEMAND 0.	2 2.15
Sub Total		0.	2 2.15
Sub Total		0.	0.00
Miscellane Lights Base Util Misc Equi Sub Total	ities	2. 0. 0. 2.	0.00

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDINGS 101-114

Time/Date Program was Run:

Dataset Name:

Weather File Code: CARLISLE | Location: ENERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) |Summer Design Wet Bulb: 72 (F) Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: 0.20 Winter Ground Relectance: 0:20 Air Density: 0.0742 (Lbm/cuft) Air Specific Heat: 0.2444 (8tu/lbm/F) Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft) Enthalpy Factor: 4.4519 (Lb-min./hr/cuft) Design Simulation Period: May To September System Simulation Period: January To December Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

10:42:17 1/ 7/94

CB101-14 .TM

AIRFLOW - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return - Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	PTAC	171	1.709	1,709	2,123	585	0	0
2	RAD	0	0	0	0	628	0	0
Totals		. 171	1.709	1.709	2,123	1,213	0	0

CAPACITY - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

(Design Capacity Quantities)

			(00	ling					Heating			
System Number	System Type	Capacity	Capacity	Opt. Vent Capacity (Tons)	Cooling Totals (Tone)	Main Sys. Capacity (8tuh)	Aux. Sys. Capacity (8tuh)	Preheat Capacity (8tuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	PTAC	4.2	. 3.3	3.3	4.2	-75,277	0	0	0	0	0	-75,277
2	RAD	0.0	2.1	0.0	0.0	-113.735	0	0	0	0	0	-113,735
Totals		4.7	1,0	9.9	3.2	-139,012	0	0	0	0	0	-189,012

The building beaked at hour 15 worth 7 with a capacity of 4.2 tons

ENGINEERING CHECKS - ALTERNATIVE 3 - WEATHERSTRIP & CAULKING

			Parcent		Ccol:	nng		Heat	ing	
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	8tuh/ Sg Ft	•,	Btuh/ Sq Ft	Floor Area Sq Ft
1	Main	PTAC	10.00	1.15	404.6	350.8	34.21	1.15	-50.79	1,482
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-46.12	2,466

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

******	*******	****** C	OOLING COIL	PEAK ****	******	*******			E PEAK ****	***** HEA	TING COIL	PEAK *	******
	it Time ==:		Mo/Hr:		٥		* Mc				Mo/Hr: 1	•	
0012108	HIF>	UHI	DB/WB/HR:	91/ /3/ 98.	0		* {	AD8:	91 *		OADB:	4	
		Space	Ret. Air	Ret. Air	Net.	Percnt	* 5	nace	Percnt *		ak Coil	Ja a k	Percnt
	Se	ens.+Lat.	Sensible			Of Tot		ible					Of Tot
Envelope		(8tuh)	(Btuh)	(8tuh)	· (8tuh)	(%)	* (8	tuh)	(%) *		h) (8		(%)
	e Solr	0	0		0	0.00	*	0	0.00 *			Ó	0.00
•	e Cond		0		0	0.00	*	0	0.00 *		0	0	0.00
Roof C		4.039	0		4,039			,972	11.19 *	-3,4	10 -3	,410	4.54
Glass		9,125	0		9,125			,195	31.53 *			0	0.00
Glass		2,726	0		2,726				6.77 *	,		,405	17.85
Wall C Partit		8.040	93		8,133				22.85 *				39.23
	d Floor	0 0			0				0.00 *			0	0.00
	ration	15,892			0 15,892				0.00 *			0	0.00
		39,822	93		39.915				17.73 *	·	19 -28		
Internal		0.,011	, 0		37.713		* 31	.981	90.06 *		20 -15	093	100.00
Lights		2,070	0		2.070			,078			0	0	0.00
_		1,784			1,784			884	2.49 *		0	0	0.00
Misc		0	0	0	0			0	0.00 *		0	0	0.00
Sub To	tal==>	3,855	0	0	3,255			,962	8.34 *		0	0	0.00
Ceiling		52	-52		0	0.00		568	1.60 *		23	0	0.00
	Air	j)	0	0	6,504	12.95	*	0	0.00 *		0	0	0.00
Sup. Fan					365				0.00 *			0	0.00
Ret. Fan			0		ŷ				0.00 *			0	0.00
Duct Hea		2	0		0				0.00 *			0	0.00
OV/UNDR Exhaust	-	0	-7	Δ.	0 - 7			0	0.00 *		0	0	0.00
Terminal			0			-0.01 0.00			0.00 *			0	0.00
TOT MITTAL	0,0000		V	V	V		*		0.00 *			0	0.00
Grand To	tal==>	43,729	34	. j	50,692			.510		-75,24	14 -75	7.90	100.00
!													
			000t	ING COIL ST	ELECTION						AREAS		
	lotal C	apacity	Sens Cap.	Coll Airti	Enterio	ng DB/WB/H	R Lea	ving D	8/W8/HR			s (sf	) (%)
Main Clg	(10NS) 4.2	(ממת) ד מפ	(MDN) 37.2	(CIM)	Deg F De	g F Grain	s Deg F		Grains	Floor			
Aux Clg	0.0	0.0	0.0	0	76.7 6				59.6	Part			
Opt Vent	0.0	0.0	0.0	0		0.0        0. 0.0        0.		0.0			0		
Totals		50.7	0.0	V	0.0	v.0 0.	0 0.0	0.0	0.0		922 1,592		0 0 50 16
										77411	1,372		30 10
			CTION						ENGINEERING	CHECKS	TEMPERA	TURES	(F)
			rfl Ent			Cooling	Heating		g % OA	10.0	Type	Clg	_
Main Di	(Mbh)	(cfm			Vent	171	0		g Cfm/Sqft		SADB		108.5
Main Htg	-75.3				Infil	414	414		g Cfm/Ton		Plenum	75.2	
Aux Htg Preheat	0.0 -0.0						1,709		g Sqft/Ton		Return	75.0	
Reheat	0.0				Mincfm Return	1 709	0 1,709		g Btuh/Sqft		Ret/OA	76.6	
Humidif	0.0		0.0		Exhaust	1,709 171	1,709		. People g % OA		Runarnd	75.0	
Opt Vent	0.0		0 0.0		Rm Exh	0	0		.g ъ он .g Cfm/SqFt		Fn MtrTD Fn BldTD	0.0	
Total	-75.3		•••		Auxil	0	0		g Btuh/SqFt		Fn Frict	0.0	
						•	v	., 0	,, oqi b	50,77		V.1	v.v

System 2 Block RAD - RADIATION

Peaked at 1			Mo/Hr:		_		*		'Hr: 0	*		Mo/Hr: 13		
Outside Air	^ ==>	0A0	08/₩8/HR:	0/ 0/ 0	. 0		*	04	DB:	0 *		0AD8:	4	
		Space	Ret. Air	Ret. Air	Ne	et Pero	ent *	Sp	ace	Percnt *	Space Pea	ık Coil P	eak	Percnt
	Ser	s.+Lat.	Sensible			al Of T	ot *	Sensi		Of Tot *		ns Tot S	ens	Of Tot
Envelope Lo	oads	(Btuh)		(Btuh)	· (Btul	ከ) (	(%) *	(Bt	.uh)	(%) *	(Btul	n) (8t	uh)	(%)
Skylite S	Solr	0	(	)		0 0.	00 *		0	0.00 *		0	0	0.00
Skylite (		0	(	)		0 0.	* 00		0	0.00 *		0	0	0.00
Roof Cond		0	Q	)		0 0.	* 00		0	0.00 *	-5,19	i6 -5,	156	4.53
Glass So	lar	0	(	)		0 0.	* 00		0	0.00 *		0	0	0.00
Glass Cor	nd	0	(	)		0 0.	00 *		0	0.00 *	-19,9	17 -19,	947	17.54
Wall Cond	3	0	(	)		0 0.	* 00		0	0.00 *	-43,84	16 -44,	864	39.45
Partition	1	0				0 0.	* 00		0	0.00 *		0	0	0.00
Exposed (	Floor	0				0 0.	* 00		0	0.00 *		0	0	0.00
Infiltra	tion	Ć.				0 0.	* 00		0	0.00 *	-43,76	67 -43,	767	38.48
Sub Total	l==>	<i>i</i> )	(	)		0 0	* 00		0	0.00 *	-112,7	16 -113,	734	100.00
Internal Lo							*			*		,		
Lights		Ô	(	)		ō 0.	.0ō ≯		0	0.00 *		0	0	0.00
People		0				0 0.	* 00		0	0.00 *		0	0	0.00
Misc		0	(	) 0		0 0.	* 00.		0	0.00 *		0	0	0.00
Sub Total	l==>	0	(	) 0		0 0.	* 00		0	0.00 *		0	0	0.00
Ceiling Loa	a d	0	(	)		0 0.	* 00		0	0.00 *	-5,3	12	0	0.00
Outside Air	r	Û	ĺ	) 0		0 0.	* 00		0	0.00 *		0	0	0.00
Sup. Fan He	eat					0 0	* 00			0.00 *			0	0.00
Ret. Fan He	eat		(	)		0 0.	* 00			0.00 *			0	0.00
Duct Heat	Pkup			)		0 0.	.00 *			0.00 *			0	0.00
OV/UNDR Si	zing	0				0 0.	* 00		0	0.00 *		0	0	0.00
Exhaust He	at		:			0 0	.00 *			0.00 *			0	0.00
Terminal By	ypass		(	) 0		0 0	* 00.			0.00 *			0	0.00
							*			*				
Grand Total	]::>	0	(	. 0		0 0	.00 *		0	0.00 *	-118,0	58 -113,	734	100.00
	- <b></b> -		00	DLING COIL	SELECTION-							AREAS		
											Gross Tota	al Glas	s (sf	) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F (	Grains	Deg F	Deg F	Grains	Floor	2,466		
tain Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0		
aux Clg	0.0	0.0	0.0	ŷ		0.0	0.0	0.0	0.0	0.0	ExFlr	0		
ot Vent	0.0	0.0	0.0	Û	0.0	0.0	0.0	0.0	0.0	0.0	Roof	1,394		0 0
otals	0.0	0.0									Wall	2,417	3	72 15
	-HEATING	COIL SELI	ECTION			AIRFLOWS	S (cfm)		8	ENGINEERING	CHECKS	TEMPERA	ATURES	(F)
!		Coil A			Type	Cool		Heating		% OA	0.0	Type	Clg	
	(Mbh)	(cfr			Vent		0	0	_	cfm/Sqft		SADB	0.0	
Main Htg	-113.7	,	0 0.0		Infil		0	628	_	cfm/Ton		Plenum	0.0	
-	0.0				Supply		0	0	-	Sqft/Ton		Return	0.0	
_	0.0				Mincfm		0	0		Btuh/Sqft		Ret/OA	0.0	
Reheat	0.0		0 0.0		Return		0	0		People	0	Runarnd	0.0	
lumidif.	0.0		0 0.0		Exhaust		0	0			0.0	Fn MtrID	0.0	
(CHILLII														
)pt Vent	0.0		0 0.0	0.0	Rm Exh		0	0	Htc	g Cfm/SqFt	0.00	fn BldID	0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

------ BUILDING U-VALUES-----

					Roo	m U-Val	ues				Room	Room
	·					/hr/sqf					Mass	Capac.
Room				Summr	Wintr	, ,	Summr	Wintr			(1b/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
				·	-							
1	TV ROOM	0.000	0.000	0.000	0.000		0.810	0.837	0.343	0.000	203.7	47.66
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	45.0	12.23
3	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	45.0	12.23
4	TV ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	224.4	52.22
5	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	158.6	37.76
6	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	41.83
7	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	158.6	37.76
8	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	41.83
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	131.3	31.54
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	131.3	31.54
1	TV ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	203.7	47.66
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	45.0	12.23
3	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	45.0	12.23
4	TV ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	224.4	52.22
5	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	158.6	37.76
6	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	41.83
7	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	158.6	37.76
8	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	41.83
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	131.3	31.54
9	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	151.3	35.58
10	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
11	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
12	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	151.3	35.58
13	REAR FOYER	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	332.9	73.43
14	REAR FOYER	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	401.2	88.44
15	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	107.2	26.46
16	8EDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	107.2	26.46
17	HALL	0.000	0.000	0.000	0.000	0.058	0.000	0.000	0.000	0.000	14.3	6.08
18	HALL	0.000	0.000	0.000	0.000	0.058	0.000	0.000	0.000	0.000	14.3	6.08
19	BATH	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	133.8	32.31
20	BATH	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	133.8	32.31
Zone .	2 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	105.4	25.59
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	120.9	29.17
Buildir	ng .	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	124.8	30.06

BUILDING AREAS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

------BUILDING AREAS------

	-			Floor	Total		Exposed					-	
			er of	Area/Dupl	Floor	Partition	Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room		Dupl	icate	Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(\$)	(sqft)
1	TV ROOM	1	1	160	160	. 0	0	0	0	160	78	25	228
- 2	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
3	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
4	TV ROOM	1	1	160	160	0	0	0	0	160	53	17	253
5	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	1	1	145	145	0	0	0	0	145	. 20	10	178
7	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
8	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
Zone	1 Total/Ave.				1,482	0	0	0	0	922	250	16	1,342
System	1 Total/Ave.				1,482	0	0	0	0	922	250	16	1,342
1	TV ROOM	1	1	160	160	0	0	0	0	160	78	25	228
2	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
3	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
4	TV ROOM	1	1	160	160	0	0	0	0	160	53	17	253
5,	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	1	1	145	145	. 0	0	0	0	145	20	10	178
7	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
8:	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
Zone	1 Total/Ave.				1,482	0	0	0	0	922	250	16	1,342
9	DINING ROOM	1	1	148	148	0	0	0	0	0	25	13	162
10	KITCHEN	1	1	108	108	0	0	0	0	0	0	0	0
11	KITCHEN	1	1	108	108	0	0	0	0	0	0	0	0
12	DINING ROOM	1	1	148	148	0	0	0	0	0	25	13	162
13	REAR FOYER	1	1	. 33	33	0	0	0	0	33	16	17	78
. 14	REAR FOYER	1	1	33	33	0	0	0	Ò	33	16	14	94
15	BEDROOM	1	1	80	80	0	0	. 0	0	80	10	15	56
16	BEDROOM	1	1	80	. 80	0	0	0	0	80	10	15	56
17,	HALL	1	1	70	70	0	0	0	0	70	0	0	0
18	HALL	1	1	70	70	0	0	0	0	70	0	0	0
19	BATH	1	1	53	53		0	0	0	53	10	17	48
20	BATH	1	1	53	53	0	0	0	. 0	53	10	17	48
Zone :	2 Total/Ave.				984	0	0	0	0	472	122	15	703
System	2 Total/Ave.				2,466	. 0	0	0	0	1,394	372	15	2,045
Buildin					3,948	0	0	0	0	2,316	622	16.	3,387

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ASHRAE 90 ANALYSIS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- A S H R A E 90 A N A L Y S I S -----

Overall Roof U-Value = 0.058 (8tu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.416 (8tu/Hr/Sq Ft/F)
Overall Building U-Value = 0.285 (8tu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.58 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 16.39 (Btu/Hr/Sq Ft) SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

## System Totals

Percent	Cool	ling Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	1
Design Load	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
		, ,		• ,			` ,	( )		(	( )	
0 - 5	0.2	8	112	-9,451	9	405	85.5	0	0	0.0	0	0
5 - 10	0.4	13	190	-18,901	13	577	170.9	0	0	0.0	0	. 0
10 - 15	0.6	13	185	-28,352	16	746	256.4	0	0	0.0	0	0
15 - 20	0.8	5	69	-37,802	20	890	341.8	42	1,530	0.0	0	0
20 - 25	1.1	11	153	-47,253	22	993	427.3	0	. 0	0.0	0	0
25 - 30	1.3	12	169	-56,704	19	858	512.8	0	0	0.0	0	0
30 - 35	1.5	8	112	-66,154	1	66	598.2	0	0	0.0	0	0
35 - 40	1.7	15	213	-75,605	0	0	683.7	0	0	0.0	0	0
40 - 45	1.9	5	66	-85,055	0	0	769.2	0	0	0.0	0	0
45 - 50	2.1	3	42	-94,506	0	0	854.6	21	765	0.0	0	0
50 - 55	2.3	3	42	-103,957	0	0	940.1	0	0	0.0	0	Ō
55 - 60	2.5	3	40	-113,407	0	0	1,025.5	0	0	0.0	0	0
60 - 65	2.7	0	0	-122,858	0	0	1,111.0	0	0	0.0	0	0
65 - 70	3.0	0	0	-132,308	0	0	1,196.5	0	0	0.0	0	0
70 - 75	3.2	0	0	-141,759	0	. 0	1,281.9	0	0	0.0	0	0
75 - 80	3.4	0	0	-151,210	0	0	1,367.4	0	0	0.0	0	0
80 - 85	3.6	0	0	-160,660	0	0	1,452.9	0	0	0.0	0	0
85 - 90	3.8	1	20	-170,111	0	0	1,538.3	0	0	0.0	0	0
90 - 95	4.0	1	11	-179,561	0	0	1,623.8	0	0	0.0	0	Ö
95 - 100	4.2	0	0	-189,012	. 0	0	1,709.2	38	1,377	0.0	0	Ó
Hours Off	0.0	0	7,336	0	0	4,225	0.0	0	5,088	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

2 10 10 21 1 19

5

Mo./Hr.

Day Type

ł	SOUTH ON THE PROPERTY OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SOUTH OF THE SO	
Temperature	Zone Number	
Range (F)	. 1 1 2	
Max. Temp.	79.2 92.9 91.8	200
Mo./Hr	7 14 8 22 8 23	•
Day Type	1 1 1	• • •
	Number of Hours	
Above 100	0 0 0	$C_{\bullet} = C$
95 - 100	0 0 0	
90 - 95	0 1,164 589	
85 - 90	0 1,000 1,332	
80 - 85	0 764 1,007	
75 - 80	2,924 595 489	,
70 - 75	863 577 675	
65 - 70	459 4,660 4,668	
60 - 65	346 0 0	
55 - 60	1,359 0 0	•
50 <del>-</del> 55	487 0 0	
Below 50	2,322 0 0	
Min. Temp.	37.9 67.9 67.9	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3

WEATHERSTRIP & CAULKING

- M	U N	Ţ	Н	Ľ	Y	Ε	N	Ε	R	G	Y	C	0	N	S	U	M	P	T	I	0	N	
-----	-----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	524	2	350	1
Feb	474	2	341	1
March	537	2	223	0
April	505	2	87	0
May	621	2	0	- 0
June	1,150	8	0	0
July	2,010	9	0	0
Aug	1,243	9	0	0
Sept	592	8	. 0	0
Oct	529	2	22	0
Nov	505	2	152	0
Dec '	518	2	297	0
Total	9,209	9	1,471	1

Building Energy Consumption = 45,229 (8tu/Sq Ft/Year) Source Energy Consumption = 73,576 (Btu/Sq Ft/Year)

Floor Area = 3,948 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

------ EQUIPMENT ENERGY CONSUMPTION------

Ref Num	Equip - Code	Jan	Feb	 Mar	Apr	Mont May	thly Cons June	sumption July	Aug	Sep	Oct	Nov	Dec	Total
		• • • • • • • • • • • • • • • • • • • •	1 42	1141	···p·	na,	vuiic	oury	поу	Зер	UCE	MOA	Dec	Total
0	LIGHTS													
	ELEC	522	472	535	503	529	516	516	535	503	529	503	516	6,181
	PK	2.0	2.0	2.0	2.0	2.0	_ 2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
1	MISC LD					-								
	ELEC	0	0	0 -	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD				_								•	
•	GAS	0	0	٥	0	٥	0	0	0	٨	٥	. ^	۸	^
	PK	0.0	0.0	0 0.0	0.0	0 0.0	0.0	0.0	0.0	0 0.0	0 0.0	0.0	0.0	0 0.0
	1		•••		•••	•••	***	0.0	V. V	0.0	V.V	۷.۷	٧.٧	0.0
3	MISC LD													
	OIL PK	0	0 0.0	0 0.0	0	0 0.0	0	0	0 0.0	0 0.0	0	0	0	0
	i	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0 .	. 0	0	0	0	0	0	0	. 0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0
5	HISC LD													
	P HOTH20	0	0	0	0.	٥	0	0	٥	۸	۸	۸	۸	^
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0
					•			***		010	•••	•••	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161		AIR-	CLD COND	COMP <1	5 TONS								
	ELEC	0	0	0	0	0	404	1078	458	0	0	0	0	1,940
	PK	0.0	0.0	0.0	0.0	0.0	5.7	5.9	5.7	5.5	0.0	0.0	0.0	5.9
1	505200		CONO	CHOCO CA	NO.									
1	EQ5200 ELEC	0	COND 0	ENSER FAI	on 0	0	41	107	47	0	. 0	0	0	196
	PK	0.0	0.0		0.0		. 0.4	0.6	0.6	0.3	0.0	0.0	0.0	0.6
	i										•••	•••	• • • • • • • • • • • • • • • • • • • •	
1	EQ5303		CONT											
	ELEC	0	0	0	0	0	99	217	112	0	0	0	0	427
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003		FC C	ENTRIF. I	FAN C.V.									
	ELEC	0	0	0	0	92	89	92	92	89	0	0	0	453
	PK	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.2
í	EQ2102		nune	ሀለሮሮስ ሴ፣	י זיים די	MATER								
1	P HOTH20	350	341	HASED DI: 223	87 - 87	WAIER 0	0	0	0	۸	22	150	207	1 474
	PK	0.6	0.6	0.4	0.2	0.0	0.0	0.0	0.0	0 0.0	22 0.2	152 0.3	297 0.5	1,471 0.6
							- • •	- • •						V.0
1	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.							•	

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

INCHAINTE & CHOCKING

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0.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

***********	U T I L I T Y	PEAK	C H E C K S U M S	
1			•	
Utility	ELECTRIC DEMAND		, , ,	

Peak Value 8.9 (kW) Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	Utili Deman Equipment Description (kl	d Of Tot
Cooling Eq	uipment		
1	EQ1161	AIR-CLD COND COMP (15 TONS 6	7 75.29
Sub Total		6.	7 75.29
Sub Total		0	0 0.00
Air Moving	Equipment		
1 :		SUMMATION OF FAN ELECTRICAL DEMAND 0.	2 2.47
Sub Total		0.	2 2.47
Sub Total		0.	0 0.00
Miscellane	ous		
Lights Base Util Misc Equi Sub Total		2. 0. 0. 2.	0.00 0 0.00
Grand Tota	1	8.	9 100.00

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     TRACE
         600
            ANALYSIS
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**ENERGY SAVINGS OPPORTUNITY STUDY** CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY **BENATEC ASSOCIATES** BUILDINGS 101-114

Weather File Code: CARLISLE Location: ENERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) Summer Design Wet Bulb: 72 (F) Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 0.0742 (Lbm/cuft) Air Density: 0.2444 (Btu/lbm/F) Air Specific Heat: 1.0882 (8tu-min./hr/cuft/F) Density-Specific Heat Prod: Latent Heat Factor: 4.790.2 (Btu-min./hr/cuft) 4.4519 (Lb-min./hr/cuft) Enthalpy Factor: To September Design Simulation Period: May System Simulation Period: January To December Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run:

1/ 7/94 11: 2:22

Dataset Name:

CB101-14 .TM

AIRFLOW - ALTERNATIVE 4 COMBINED ECOS

(Design Airflow Quantities)

			Main			Auxil.	Room
System System Number Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1 PTAC	115	1,148	1,148	1,451	417	0	0
2 RAD	0	0	0	. 0	459	0	0
Totals	115	1,148	1,148	1,451	876	0	0

CAPACITY - ALTERNATIVE 4
COMBINED ECOS

------SYSTEM SUMMARY-------(Design Capacity Quantities)

			Coo	ling					Heating			
System Number	System Type			Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (8tuh)	Heating Totals (8tuh)
1.	PTAC	2.9	0.0	0.0	2.9	-41,060	0	0	0	0	0	-41,060
2	RAD	0.0	0.0	0.0	0.0	-61,907	0	0	0	0	. 0	-61,907
Totals		2.9	0.0	0.0	2.9	-102,967	0	0	0	0	0	-102,967

The building peaked at hour 16 month 7 with a capacity of 2.9 tons

ENGINEERING CHECKS - ALTERNATIVE 4
COMBINED ECOS

------ ENGINEERING CHECKS------ENGINEERING

1			Percent		Cool:	ing	Heat			
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	PTAC	10.00	0.77	393.8	508.3	23.61	0.77	-27.71	1,482
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-25.10	2,466

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

*****	******	****** CO	OLING COIL	PEAK ****	******	*******	***** CL(	S SPACE	E PEAK ****	****** HE	ATING COI	L PEAK	******
Peaked	at Time ==	:>	Mo/Hr:	7/16				o/Hr:		<b>k</b>	Mo/Hr:		
Outside	e Air ==>	OAD	8/W8/HR: '	91/ 73/ 98.	. 0		* (	DADB:	91	<b>k</b>	OADB:	-	•
							*		;	<b>t</b>			
		Space	Ret. Air	Ret. Air	Net	Percnt	* 5	Space	Percnt :	Space P	eak Coi	l Peak	Percnt
		Gens.+Lat.	Sensible	Latent	Total	Of Tot		sible	Of Tot	•		t Sens	Of Tot
	e Loads	(Btuh)	(8tuh)	(8tuh)	(8tuh)	(%)	* (6	Btuh)	(%)			(Btuh)	(\$)
Skyli	te Solr	0	0		0		•	Ó	0.00		0	0	0.00
Skyli	te Cond	0	0		0	0.00	*	0	0.00		Ò	Ō	0.00
Roof	Cond	1,644	0		1,644			,695	6.91		582	-1,582	3.86
Glass	Solar	9,125	0		9,125			,195	45.64	,	0	0	0.00
Glass	Cond	2,726	0		2,726			2,404	9.80		•	13,405	32.68
₩all	Cond	1,354	16		- 1,369	3.91		,341	5.47 4	•		-4,976	12.13
Parti	tion	0			. 0	0.00		0	0.00	•	0	0	0.00
Expos	ed Floor	0			0	0.00		0	0.00		0	Ŏ	0.00
Infil	tration	11,613			11,613			,602	18.76		•	21,060	51.34
Sub T	otal::>	26,462	16		26,478			,237	86.57 *			41,023	100.00
Interna	l Loads				. ,		*	, ·	*	•		11,020	100.00
Light	S	2,070	0		2,070	5.92	* 2	,078	8.47 *		0	0	0.00
Peopl	е	1,784			1,784	5.10		884	3.60 *		0	0	0.00
Misc		0	0	0	0	0.00		0	0.00 *		0	Õ	0.00
Sub T	otal::>	3,855	0	0	3,855	11.02		,962	12.07 *		0	0	0.00
Ceiling	Load	10	-10		. 0	0.00		332	1.35 *		320	ň	0.00
Outside	Air	0	0	0	4,410	12.60		0	0.00 *		0	Ŏ	0.00
Sup. Fa	n Heat				245	0.70		•	0.00 *		•	Ô	0.00
Ret. Fa	n Heat		0		. 0	0.00			0.00 *			0	0.00
Duct He	at Pkup		0		0	0.00			0.00 *			0	0.00
OV/UNDR	Sizing	0			0	0.00		0	0.00 *		0	0	0.00
Exhaust	Heat		-1	0	-1	-0.00		·	0.00 *		v	n	0.00
Termina	l Bypass		0	0	0	0.00			0.00 *			0	0.00
							*		*			v	0.00
Grand To	otal==>	30,326	5	. 0	34,986	100.00	* 24	,532	100.00 *	-41,2	79 -4	1,023	100.00
			C00L	ING COIL SI	ELECTION						AREAS		
İ	Total (	Capacity S	Sens Cap.	Coil Airfl	Enterin	g DB/WB/H	R Lea	ving D	8/WB/HR	Gross Tot			f) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg	F Grain			Grains	Floor			'' ("
Main Clg	2.9	35.0	25.1	1,148	- 76.6 63	.7 69.		53.4		Part	0		
Aux Clg	0.0	0.0	0.0	0	0.0 0	.0 0.0	0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0 0	.0 0.0	0.0	0.0		Roof	922		0 0
Totals	2.9	35.0				•				Wall	1,592	2	250 16
	HEATING	COIL SELEC	TION		AIR	FLOWS (cfr	n)		ENGINEERING	CHECKS	TFM0F	RATIIRES	S (F)
	Capacity	/ Coil Air	fl Ent	Lvg		Cooling	Heating		g % OA	10.0	Type	Clg	
	(Mbh)	(cfm)	Deg F	Deg F	Vent	115	0		g Cfm/Sqft	0.77	SAD8	55.4	
Main Htg	-41.1	1,14		101.0	Infil	302	302		g Cfm/Ton	393.83	Plenum	75.0	
Aux Htg	0.0	)	0.0		Supply	1,148	1,148		g Sqft/Ton	508.32	Return	75.0	I
Preheat	-0.0	1,14			Mincfm	0	0		g Btuh/Sqft		Ret/OA	76.6	I
Reheat	0.0		0.0		Return	1,148	1,148		. People	5	Runarnd		
Humidif	0.0	)	0.0		Exhaust	115	0		3 % OA	0.0	Fn MtrI		I
Opt Vent	0.0	)			Rm Exh	0	0		Cfm/SqFt		Fn 81dT		
Total	-41.1				Auxil	0	0	-	Btuh/SqFt		Fn Fric		
							·	•;	,		, 10		

System 2 Block RAD - RADIATION

*****	******	****** ((	OLING COIL	PEAK ****	******	******	***** CL	G SPACE	PEAK ****	***** HEA	TING COIL	PEAK 1	******
	at Time ==>		Mo/Hr: (						0/0 *		Mo/Hr: 1	3/1	
Outside	: Air ==>	140	B/WB/HR:	0/ 0/ 0.	0		*	OADB:	0 *		OAD8:	4	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Space	Percnt *	Space Pe	ak Coil	Peak	Percnt
	Se	ns.+Lat.	Sensible	Latent	Total	Of Tot		sible	Of Tot *				Of Tot
Envelop	e Loads	(Btuh)	(8tuh)	(Btuh)	(Btuh)	(%)	* (	Btuh)	(%) *	•		tuh)	(\$)
Skyli	te Solr	0	0		0	0.00	*	Ó	0.00 *		Ó	Ó	0.00
Skyli	te Cond	0	0		0	0.00	*	0	0.00 *		0	0	0.00
Roof	Cond	0	0		0	0.00	*	0	0.00 *	-2,3	92 -2	,392	3.86
Glass	Solar	0	0		Q	0.00	*	0	0.00 *			0	0.00
Glass	Cond	0	0		0	0.00	*	0	0.00 *	-19,9	47 -19	,947	32.22
₩all		0	0		0	0.00	*	0	0.00 *	-7,4		584	12.25
Parti	tion	0			0	0.00	*	0	0.00 *			0	0.00
Expos	ed Floor	0			0	0.00	*	0	0.00 *		0	0	0.00
Infil	tration	0			0	0.00	*	0	0.00 *	-31,9	84 -31	,984	51.66
Sub T	otal==>	0	0		0	0.00	*	0	0.00 *			,907	100.00
Interna							*		*			-	
Light	S	0	0		0	0.00	*	0	0.00 *		0	0	0.00
People	е	0			0	0.00	*	0	0.00 *		0	0	0.00
Misc		0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
Sub To	otal==>	0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
Ceiling		0	0		0	0.00	*	0	0.00 *	-2,4	08	0	0.00
Outside	Air	0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
Sup. Fai					0	0.00	*		0.00 *			0	0.00
Ret. Far			0		. 0	0.00	*		0.00 *		•	0	0.00
Duct Hea			0		0	0.00	*		0.00 *			0	0.00
OV/UNDR		0			0	0.00		0	0.00 *		0	0	0.00
Exhaust			0	0	0	0.00	*		0.00 *			0	0.00
Terminal	l Bypass		0	0	0	0.00	*		0.00 *			0	0.00
Grand To	otal==>	0	0	. 0	0	0.00	*	0	0.00 *	-64,1	36 -61	,907	100.00
			cool	ING COIL S	ELECTION						AREAS-		
1	Total Ca		Sens Cap.			g D8/W8/	HR Lea	avina D	B/WB/HR	Gross Tot		ss /sf	(\$)
1	(Tons)	(Mbh)		(cfm)					Grains	Floor	2,466		, (*,
Main Clg	0.0	0.0	0.0	0	. 0.0 0				0.0	Part	•		
Aux Clg	0.0	0.0	0.0	0	0.0 0	.0 0	.0 0.0	0.0			Ō		•
Opt Vent	0.0	0.0	0.0	0	0.0 0	.0 0	.0 0.0	0.0		Roof			0 0
Totals	0.0	0.0				,				Wall	2,417		72 15
	HEATING	COIL SELE	CTION		AIR	FLOWS (c	fm)		ENGINEERING	CHECKS	TEMPER	ATURES	(F)
•	Capacity				Type ·		Heating		g % OA	0.0	Туре	Clg	
	(Mbh)	(cfm			Vent	Ö			g Cfm/Sqft		SADB	0.0	-
Main Htg		•	0.0	0.0	Infil	0	459		g Cfm/Ton		Plenum	0.0	
Aux Htg	0.0		0.0	0.0	Supply	0			g Sqft/Ton		Return	0.0	
Preheat:	0.0		0.0	0.0	Mincfm	0	(		g Btuh/Saft		Ret/OA	0.0	
Reheat	0.0		0.0	0.0	Return	0			. People	0	Runarnd	0.0	
Humidif	0.0		0.0	0.0	Exhaust	0	(		g % OA		Fn MtrTD		
Opt Vent	0.0		0.0	0.0	Rm Exh	0	(		g Cfm/SqFt		Fn BldTD		
Total	-61.9				Auxil	0	(		g Btuh/SqFt		Fn Frict		
									•				

BUILDING U-VALUES - ALTERNATIVE 4 COMBINED ECOS

----- BUILDING U-VALUES------

		Room U-Values									Room	Room
		(Btu/hr/sqft/F)									Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	208.2	48.56
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	45.7	12.37
3	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	45.7	12.37
4	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	229.3	53.18
5	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
. 6	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
7	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
8	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	134.1	32.10
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	134.1	32.10
1	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	208.2	48.56
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	45.7	12.37
3	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	45.7	12.37
4	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	229.3	53.18
5	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
6	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
7	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
8	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	134.1	32.10
- 9	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	154.0	36.11
10	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
11	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
12	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	154.0	36.11
13	REAR FOYER	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	339.6	74.77
14	REAR FOYER	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	409.2	90.02
15	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	109.9	27.00
16	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	109.9	27.00
17,	HALL	0.000	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.000	15.3	6.28
18	HALL	0.000	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.000	15.3	6.28
19	BATH	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	137.0	32.95
20	BATH	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	137.0	32.95
Zone .	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	107.6	26.03
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	123.5	29.68
Buildin	g	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	127.5	30.59

BUILDING AREAS - ALTERNATIVE 4 COMBINED ECOS

------ BUILDING AREAS-----

													1
				Floor	Total		Exposed						
		Numb	er of	Area/Dupl	Floor	Partition	Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room		Dupl	icate	Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(\$)	(sqft)
1	TV ROOM	1	1	160	160	_ 0	0	0	0	160	78	25	228
2	LIVING ROOM	1	1	280	280	0	0	. 0	0	0	20	20	82
3	LIVING ROOM	1	1	280	. 280	0	0	0	0	0	20	20	82
4	TV ROOM	1	1	160	160	0	0	0	0	160	53	17	253
5	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
7	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
8	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
Zone	1 Total/Ave.				1,482	0	0	0	0	922	250	16	1,342
System	1 Total/Ave.				1,482	0	0	0	0	922	250	16	1,342
1	TV ROOM	1	1	160	160	0	0	0	0	160	78	25	228
2	LIVING ROOM	i	1	280	280	0	0	0	0	0	20	20	82
3	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
4	TV ROOM	i	1	160	160	0	0	0	0	160	53	17	253
5	BEDROOM	. 1	1	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
7	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
8	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
Zone -	<ol> <li>Total/Ave.</li> </ol>				1,482	0	0	0	0	922	250	16	1,342
. 9	DINING ROOM	1	1	148	148	0	0	0	0	0	25	13	162
10	KITCHEN	1	1	108	108	, 0	0	0	0	0	0	0	0
11	KITCHEN	i	1	108	108	` 0	0	0	0	0	0	0	0
12	DINING ROOM	1	1	148	148	0	0	0	0	0	25	13	162
13	REAR FOYER	1	1	33	. 33	0	0	0	0	33	16	17	78
14	REAR FOYER	1	1	33	33	0	0	0	0	33	16	14	94
15	8EDROOM	1	1	. 80	80	0	0	0	0	80	10	15	56
16	BEDROOM	1	1	80	80	0	0	0	0	80	10	15	56
17.	HALL	1	1	70	70	0	0	0	0	70	0	0	0
18:	HALL	1	1	70	70	0	0	0	0	70	0	0	0
19	BATH	1	1	53	53	0	0	0	0	53	10	17	48
20	BATH	1	1	53	53	0	0	0	0	53	10	17	48
Zone	2 Total/Ave.				984	0	0	0	0	472	122	15	703
System	2 Total/Ave.				2,466	0	0	0	0	1,394	372	15	2,045
Buildin	g				3,948	0	0	0	0	2,316	622	16	3,387

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ASHRAE 90 ANALYSIS - ALTERNATIVE 4 COMBINED ECOS

------ A S H R A E 90 A N A L Y S I S -----

Overall Roof U-Value = 0.027 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.175 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.121 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.35 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 15.01 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4 COMBINED ECOS

------SYSTEM LOAD PROFILE

### System Totals

Percent	Cool	ing Loa	d	Heatir	ng Load		Cooling	Airflow		Heating	Airflow	
Design Load		Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.1	9	112	-5,148	7	249	57.4	0	0	0.0	0	0
5 - 10	0.3	7	94	-10,297	- 12	417	114.8	0	0	0.0	0	0
10 - 15	0.4	11	136	-15,445	18	659	172.2	0	0	0.0	0	4 0
15 - 20	0.6	5	69	-20,593	26	939	229.6	41	1,519	0.0	0	- 0
20 - 25	0.7	10	124	-25,742	17	622	287.1	0	11	0.0	. 0	0
25 - 30	0.9	16	203	-30,890	18	634	344.5	0	0	0.0	0	0
30 - 35	1.0	4	53	-36,039	3	94	401.9	0	0	0.0	0	0
35 - 40	1.2	5	62	-41,187	0	0	459.3	0	0	0.0	0	0
40 - 45	1.3	6	74	-46,335	0	0	516.7	0	0	0.0	0	0
45 - 50	1.5	12	147	-51,484	0	0	574.1	21	765	0.0	0	0
50 - 55	1.6	7	88	-56,632	0	0	631.5	0	0	0.0	0	0
55 - 60	1.7	2	20	-61,780	0	0	688.9	0	0	0.0	0	0
60 - 65	1.9	2	20	-66,929	0	0	746.3	0	0	0.0	0	0
65 - 70	2.0	2	31	-72,077	0	0	803.8	0	0	0.0	0	0
70 - 75	2.2	0	0	-77,225	0	. 0	861.2	0	0	0.0	. 0	0
75 - 80	2.3	0	0	-82,374	0	0	918.6	0	0	0.0	0	0
80 - 85	2.5	0	0	-87,522	0	0	976.0	0	0	0.0	0	0
85 - 90	2.6	0	0	-92,670	0	0	1,033.4	0	0	0.0	0	0
90 - 95	2.8	0	0	-97,819	0	0	1,090.8	0	0	0.0	0	0
95 - 100	2.9	2	31	-102,967	. 0	0	1,148.2	38	1,377	0.0	0	0
Hours Off	0.0	0	7,496	0	0	5,146	0.0	0	5,088	0.0	0	8,760

Day Type

5 1 1

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4 COMBINED ECOS

		•••••		BUILDING TEMPERATURE PROFILES
Temperature Range	1	<u>1</u>	2	Zone Number
(F)				
Max. Temp.	78.8	95.6	94.9	
Mo./Hr.	7 14	9 21	9 20	
	- 1			
				Number of Hours
Above 100	0	0	0	
95 - 100	0	311	0	
90 - 95	0	1,897	1,983	
85 - 90		301		
80 - 85	0	855	947	
75 - 80	3,013	449	443	
70 - 75	790	635	653	
65 - 70	997	4,312	4,296	
60 - 65	472			
55 - 60	1,415	0	0	
50 - 55	519	0	0	
Below 50	1,554	0	0	
Min. Temp.	42.0	67.9	68.0	
Mo./Hr.	2 10			
	_			

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4 COMBINED ECOS

------ MONTHLY ENERGY CONSUMPTION------

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	On Peak	HOT W DMND On Peak
HOHUH	( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	(KW)	(Therm)	(Thrm/hr)
Jan	523	2	171	0
Feb	473	2	170	. 0
March	536	. 2	105	0.
April	504	2	26	0
May	591	2	0	. 0
June	1,014	6	0	0
July	1,511	7	0	0
Aug	1,105	7	0	0
Sept	602	6	0	0
0ct	529	2	0	0
Nov	504	2	36	0
Dec	517	2	141	0
Total	8,409	7	649	0

Building Energy Consumption = 23,717 (8tu/Sq Ft/Year) Source Energy Consumption = 43,741 (Btu/Sq Ft/Year)

Floor Area = 3,948 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4

COMBINED ECOS

1 EQ5020

HEAT WATER CIRC. PUMP C.V.

ef	Equip -					Mont	hly Cons	umption ·						
	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	0ct	Nov	Dec	Tota
0	LIGHTS													
	PK ELEC	522 2.0	472 2.0	535 2.0	503 2.0	529 2.0	516 _2.0	516 2.0	535 2.0	503 2.0	529 2.0	503 2.0	516 2.0	6,18 2.
1	MISC LD													* .
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
2	MISC LD	۸	٥	^	^	^	•	٨	•	•	^	•	•	
	GAS PK	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0.
_		•••	•••			• • • • • • • • • • • • • • • • • • • •		•.•		•••	•••		***	
3	MISC LD OIL	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
5	MISC LD													
•	P HOTH20 PK	0 0.0	0.0	0.0	0 0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.
		0.0	V.V	0.0		0.0	۷.۷	۷.۷	V.V	0.0	۷.۷	۷.۷	0.0	۷.
6	MISC LD P CHILL	0	0	0	0	0	0	0	٥	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0.0	0.
1	EQ1161		AIR-	CLD COND	COMP <1	5 TONS								
_	ELEC	0	0	0	0	0	316	693	368	20	0	0	0	1,39
	PK	0.0	0.0	0.0	0.0	0.0	3.7	4.0	3.9	3.8	0.0	0.0	0.0	. 4.
1	EQ5200		COND	ENSER FA	NS									
	ELEC	0	0	0	0	0	33	70	38	2	0	0	0	14
	PK	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.4	0.3	0.0	0.0	0.0	0.
1	EQ5303		CONT					•						
	PK PK	0.0	0 0.0	0 0.0	0 0.0	0 0.0	90 0.3	170 0.3	102 0.3	17 0.3	0 0.0	0 0.0	0 0.0	37 0.
		V.V				0.0	<b>V.</b> 0	0.5	0.5	0.5	V.V	۷.۷	V.V	۷.
1	E04003	^		ENTRIF.		/0	//	40	40	4.6		•		
	ELEC PK	0.0	0 0.0	0 0.0	0 0.0	62 0.1	60 0.1	62 0.1	62 0.1	60 0.1	0 0.0	0 0.0	0 0.0	30 0.
		0.0					V.1	V.1	V.1	V.1	٧.٧	۷.۷	V.V	, V.
1	E02102	171			ST. HOT 1		٨	۸	٨	^	^	7/	1.43	
	P HOTH20 Pk	171 0.3	170 0.3	105 <b>0</b> .2	26 0.1	0	0.0	0 0.0	0.0	0 0.0	0.0	36 0.2	141 0.3	. 0.

Trane Air Conditioning Economics By: Trane Customer Direct Service Network

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 COMBINED ECOS

0.0 10.0 ELEC 0.0 0 1 5 PK 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

Trane Air Conditioning Economics

By: Trane Customer Direct Service Network

UTILITY PEAK CHECKSUMS - ALTERNATIVE 4 COMBINED ECOS

	$\tt U \ I \ I \ I \ I \ Y$	PEAK	CHECKSUMS	
--	-----------------------------	------	-----------	--

Utility	EL	<b>ECTRI</b>	C DEMAN	١D
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Peak Value 6.8 (kW) Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	Utility Demand Equipment Description (kW)	Percnt Of Tot (%)
Cooling Ed	quipment		
1	EQ1161	AIR-CLD COND COMP <15 TONS 4.7	68.93
Sub Total		4.7	68.93
Sub Total		0.0	0.00
Air Moving	g Equipment		
1		SUMMATION OF FAN ELECTRICAL DEMAND 0.1	2.16
Sub Total		0.1	2.16
Sub Total		0.0	0.00
Miscellane	ous		
Lights	141	2.0	28.91
Base Util Misc Equi		· 0.0	0.00 0.00
Sub Total	. Рисп с	2.0	28.91
Grand Jota	il	6.8	100.00

Building 116
Trace Input File

```
CONTENTS OF : E:\CB116.TM
LINE #
   1
       JOB - 1
   2
       01/ENERGY SAVINGS OPPORTUNITY STUDY
   3
       01/CARLISLE BARRACKS, PA
   4
       01/DEPARTMENT OF THE ARMY
   5
       01/BENATEC ASSOCIATES
   6
       01/BUILDING 116
   7
       08/CARLISLE
   8
       09/MAY/SEP////APR/OCT
   9
       10/CLTD-CLF
  10
       11///ZONE
  11
       LOAD - 1
  12
       19/1/BASE BUILDING
       20/1/1/1ST FL APART'S/27566/1//1
  13
  14
       20/2/2/2ND FL APART'S/27566/1//1
  15
       20/3/3/POST NURSERY/2260/1//1
  16
       20/4/4/POST NURSERY/2849/1//1
  17
       20/5/5/BASEMENT/22457/1//1
  18
       21/1///CBLQTX///CBLQTX
  19
       21/2///CBLQTX///CBLQTX
  20
       21/3///CBADCTX///CBADHTX
  21
       21/4///CBADCTX///CBADHTX
       21/5///CBADCTX///CBADHTX
  22
  23
       22/2/1/YES////129
       24/1/1/188/8//170/38
  24
  25
       24/1/2/596/8//170/128
  26
       24/1/3/188/8//170/218
  27
       24/1/4/596/8//170/308
  28
       24/2/1/188/8//170/38
  29
       24/2/2/596/8//170/128
 30
       24/2/3/188/8//170/218
 31
       24/2/4/596/8//170/308
 32
       24/3/1/15/8//170/38
 33
       24/3/2/15/8//170/218
 34
       24/3/3/86/8//170/308
 35
       24/4/1/15/8//170/38
 36
       24/4/2/32/4//170/128
       24/4/3/70/8//170/218
 37
 38
       24/4/4/55/8//170/308
 39
       24/5/1/99/8//170/38
 40
       24/5/2/455/4//170/128
 41
       24/5/3/45/8//170/218
       24/5/4/456/8//170/308
 42
       25/1/1/6/2.75/12/.52/.57
 43
 44
       25/1/2/6/2.75/45/.52/.57
 45
       25/1/3/6/2.75/12/.52/.57
 46
       25/1/4/6/2.75/73/.52/.57
 47
       25/2/1/6/2.75/12/.52/.57
 48
       25/2/2/6/2.75/45/.52/.57
       25/2/3/6/2.75/12/.52/.57
 49
 50
       25/2/4/6/2.75/73/.52/.57
 51
       25/3/3/4.5/2.75/10/.52/.57
 52
       25/4/2/2.5/2.5/2/.52/.57
 53
       25/4/3/4.5/2.75/5/.52/.57
 54
      25/4/4/4.5/2.75/6/.52/.57
 55
      25/5/1/4.5/2.75/6/.52/.57
 56
      25/5/2/2.5/2.5/12/.52/.57
 57
      25/5/4/4.5/2.75/43/.52/.57
      26/1/CBLQP/CBLQL/OFF//OFF/OFF/OFF/CBLQL/OFF
 58
```

```
CONTENTS OF : E:\CB116.TM
LINE #
 59
      26/2/CBLQP/CBLQL/OFF//OFF/OFF/OFF/CBLQL/OFF
  60
       26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF
  61
       26/4/CBADP&L/CBADP&L/OFF//OFF/CBADFAN/OFF/OFF/OFF/OFF
 62
       26/5/CBADP&L/CBADP&L/OFF/OFF/OFF/OFF/OFF/OFF
 63
       27/1/551/SF-PERS/230/190/.5/WATT-SF/INCAND
 64
       27/2/551/SF-PERS/230/190/.5/WATT-SF/INCAND
 65
       27/3/226/SF-PERS/315/325/1.5/WATT-SF
 66
       27/4/285/SF-PERS/255/255/1.5/WATT-SF
 67
       27/5/1123/SF-PERS/255/255/1.5/WATT-SF
 68
       29/1/////.43/CFM-SF
 69
       29/2//////.43/CFM-SF
 70
       29/3////.43/CFM-SF/.43/CFM-SF
 71
       29/4////.43/CFM-SF/.43/CFM-SF
 72
       29/5//////.43/CFM-SF
 73
       30/1////////1200/CFM
 74
      30/2///////1200/CFM
 75
      30/3/2500/CFM
 76
      30/4/2550/CFM/2550/CFM
 77
      31/4/1/32/4//147/SINE-FIT/80/50
 78
      31/5/1/455/4//147/SINE-FIT/80/50
 79
      SYSTEM - 1
      39/1/BASE BUILDING
 80
 81
      40/1/SZ
 82
      41/1/3/3
      42/1/.36
 83
 84
      45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 85
      40/2/SZ
 86
      41/2/4/4
 87
      42/2/.27
 88
      45/2/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
 89
      40/3/RAD
      41/3/1/3/5/5
 90
 91
      42/3/////.5
 92
      45/3/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 93
      EQUIPMENT - 1
 94
      59/1/CARLISLE///BASE BUILDING
      60/1/1/PKPLANT/1/1
 95
 96
      60/2/2/PKPLANT/2/2
 97
      62/1/EQ1161/1
 98
      62/2/EQ1161/2
 99
      65/1/1//2/3
100
      67/1/EQ2102/1
      69/1/EQ4003
101
102
      69/2/EQ4003
      69/3/////EQ4003
103
104
      LOAD - 2
      19/2/WEATHERSTRIP & CAULKING
105
106
      20/1/1/1ST FL APART'S/27566/1//1
107
      20/2/2/2ND FL APART'S/27566/1//1
108
      20/3/3/POST NURSERY/2260/1//1
109
      20/4/4/POST NURSERY/2849/1//1
110
      20/5/5/BASEMENT/22457/1//1
111
      21/1///CBLQTX///CBLQTX
112
      21/2///CBLQTX///CBLQTX
113
      21/3///CBADCTX///CBADHTX
114
      21/4///CBADCTX///CBADHTX
115
      21/5///CBADCTX///CBADHTX
116
      22/2/1/YES////129
```

```
CONTENTS OF : E:\CB116.TM
LINE #
117
       24/1/1/188/8//170/38
118
       24/1/2/596/8//170/128
119
       24/1/3/188/8//170/218
120
       24/1/4/596/8//170/308
121
       24/2/1/188/8//170/38
122
       24/2/2/596/8//170/128
123
       24/2/3/188/8//170/218
124
       24/2/4/596/8//170/308
125
       24/3/1/15/8//170/38
126
       24/3/2/15/8//170/218
127
       24/3/3/86/8//170/308
128
       24/4/1/15/8//170/38
129
       24/4/2/32/4//170/128
130
       24/4/3/70/8//170/218
131
       24/4/4/55/8//170/308
132
       24/5/1/99/8//170/38
133
      24/5/2/455/4//170/128
134
      24/5/3/45/8//170/218
135
      24/5/4/456/8//170/308
136
      25/1/1/6/2.75/12/.52/.57
137
      25/1/2/6/2.75/45/.52/.57
138
      25/1/3/6/2.75/12/.52/.57
139
      25/1/4/6/2.75/73/.52/.57
140
      25/2/1/6/2.75/12/.52/.57
141
      25/2/2/6/2.75/45/.52/.57
142
      25/2/3/6/2.75/12/.52/.57
143
      25/2/4/6/2.75/73/.52/.57
144
      25/3/3/4.5/2.75/10/.52/.57
145
      25/4/2/2.5/2.5/2/.52/.57
146
      25/4/3/4.5/2.75/5/.52/.57
147
      25/4/4/4.5/2.75/6/.52/.57
148
      25/5/1/4.5/2.75/6/.52/.57
149
      25/5/2/2.5/2.5/12/.52/.57
150
      25/5/4/4.5/2.75/43/.52/.57
      26/1/CBLQP/CBLQL/OFF//OFF/OFF/OFF/CBLQL/OFF
151
152
      26/2/CBLQP/CBLQL/OFF//OFF/OFF/OFF/CBLQL/OFF
153
      26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF
154
      26/4/CBADP&L/CBADP&L/OFF//OFF/CBADFAN/OFF/OFF/OFF
155
      26/5/CBADP&L/CBADP&L/OFF/OFF/OFF/OFF/OFF/OFF
156
      27/1/551/SF-PERS/230/190/.5/WATT-SF/INCAND
157
      27/2/551/SF-PERS/230/190/.5/WATT-SF/INCAND
158
      27/3/226/SF-PERS/315/325/1.5/WATT-SF
159
      27/4/285/SF-PERS/255/255/1.5/WATT-SF
160
      27/5/1123/SF-PERS/255/255/1.5/WATT-SF
161
      29/1/////.38/CFM-SF
162
      29/2/////.38/CFM-SF
      29/3////.38/CFM-SF/.38/CFM-SF
163
164
      29/4////.38/CFM-SF/.38/CFM-SF
165
      29/5//////.38/CFM-SF
166
      30/1///////1200/CFM
167
      30/2///////1200/CFM
168
      30/3/2500/CFM
169
      30/4/2550/CFM/2550/CFM
170
      31/4/1/32/4//147/SINE-FIT/80/50
171
      31/5/1/455/4//147/SINE-FIT/80/50
172
      SYSTEM - 2
173
      39/2/WEATHERSTRIP & CAULKING
174
      40/1/SZ
```

```
CONTENTS OF : E:\CB116.TM
LINE #
 175
       41/1/3/3
176
       42/1/.36
       45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
177
 178
       40/2/SZ
179
       41/2/4/4
180
       42/2/.27
181
       45/2/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
       40/3/RAD
182
183
       41/3/1/3/5/5
184
       42/3/////.5
185
       45/3/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF
186
       EQUIPMENT - 2
       59/2/CARLISLE///WEATHERSTRIP & CAULKING
1.87
188
       60/1/1/PKPLANT/1/1
       60/2/2/PKPLANT/2/2
189
       62/1/EQ1161/1
190
191
       62/2/EQ1161/2
192
       65/1/1//2/3
193
       67/1/EQ2102/1
194
       69/1/EQ4003
195
       69/2/EQ4003
196
       69/3/////EQ4003
```

# Building 116 Trace Output File

```
*************************
**************************
                        **
      TRACE
          600
             ANALYSIS
**
**
           **
**
***************************
```

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 116

Weather File Code:

CARLISLE

Location:

ENERGY SAVINGS OPPORTUNITY STUDY

Latitude:

40.2 (deg)

Longitude:

77.2 (deg)

Time Zone:

5 475 (ft)

Elevation:

Barometric Pressure:

29.2 (in. Hg)

Summer Clearness Number:

1.00

Winter Clearness Number:

1.00

Summer Design Dry Bulb:

92 (F)

| Summer Design Wet Bulb:

. 72 (F)

Winter Design Dry Bulb:

4 (F)

| Summer Ground Relectance:

0.20

Winter Ground Relectance:

0.20

Air Density:

0.0742 (Lbm/cuft)

Air Specific Heat:

0.2444 (Btu/lbm/F)

Density-Specific Heat Prod:

1.0882 (Btu-min./hr/cuft/F)

Latent Heat Factor:

4,790.2 (Btu-min./hr/cuft)

Enthalpy Factor:

4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May

To September

System Simulation Period: January To December

Cooling Load Methodology:

CLTD/CLF (Transfer Function Method)

Time/Date Program was Run:

9:53:30 1/21/94

Dataset Name:

CB116 .TM

AIRFLOW - ALTERNATIVE 1 BASE BUILDING

(Design Airflow Quantities)

System Number	System Type	Outside Airflow _(Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
1	SZ	0	2,500	2,500	2,899	399	0	0
2	SZ	0	2,550	2,550	3,087	537	0	0
3	RAD	0	0	0	_ 0	14,033	0	0
Totals		. 0	5,050	5,050	5,986	14,969	. 0	0

CAPACITY - ALTERNATIVE 1 BASE BUILDING

-- SYSTEM SUMMARY ------

(Design Capacity Quantities)

			Coo	ling					Heating			
System Number	System Type	Capacity	-	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (8tuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	SZ	2.9	0.0	0.0	2.9	-49,645	0	0	0	0	0	-49.645
ī	SZ	3.8	0.0	0.0	3.8	-66,875	0	0	0	. 0	0	-66.875
	RAD	0.0		0.0	0.0	-1,921,006	0	0	0	. 0	0	-1,921,006
Totals		6.7	0.0	0.0	6.7	-2,037,526	0	0	0	0	0	-2,037,526

The building peaked at hour 16 month 7 with a capacity of 6.7 tons

ENGINEERING CHECKS - ALTERNATIVE 1 BASE BUILDING

------ENGINEERING CHECKS-------ENGINEERING

:			Percent		Cool:	ing	Heating			
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft
1	Main	SI	0.00	1.11	847.5	766.2	15.66	1.11	-21.97	2,260
2	Main	SZ	0.00	0.90	678.0	757.5	15.84	0.90	-23.47	2.849
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-24.06	79.849

System 1 Peak SZ - SINGLE ZONE

Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 13/ 1 Outside Air ==> OADB/WB/HR: 91/73/98.0 OAD8: 91 \* OAD8: 4 \* Space Percnt \* Space Peak Coil Peak Percnt Space Ret. Air Ret. Air Net Percnt \* Total Of Tot \* Sensible Of Tot \* Space Sens Tot Sens Of Tot Sens.+Lat. Sensible Latent 
 Selisible
 Off tot
 Space Sens
 fot Sens
 Uf lot

 (8tuh)
 (%) \*
 (8tuh)
 (8tuh)
 (%)

 0
 0.00 \*
 0
 0
 0.00

 0
 0.00 \*
 0
 0
 0.00

 4,331
 15.38 \*
 0
 0
 0.00

 882
 3.13 \*
 -4,208
 -4,208
 8.48

 3,882
 13.79 \*
 -15,626
 -17,645
 35.54

 0
 0.00 \*
 0.00 \*
 0.00
 Envelope Loads (Btuh) (Btuh) (Btuh) (\$\psi\$ \* 

 Skylite Solr
 0
 0

 Skylite Cond
 0
 0

 Roof Cond
 0
 0

 Glass Solar
 4,331
 0

 Glass Cond
 882
 0

 0 0.00 \* 0 0.00 \* 0 0.00 \* 4,331 12.24 \* 882 2.49 \* 3,882 502 0 4,384 12.38 \* Wall Cond 0 0.00 \* 0 0.00 \* 0 0.00 0 0.00 \* 0 0.00 \* 0 0.00 9,612 27.15 \* 6,731 23.90 \* -27,791 -27,791 55.98 19,209 54.27 \* 15,826 56.20 \* -47,626 -49,645 100.00 0 0.00 \* Partition 0 Exposed Floor 9,612 9,612 27.15 \*
18,707 502 19,209 54.27 \* Infiltration Sub Total:=> 9,487 0 9,487 26.80 \* 9,487 33.69 \* 5,990 5,990 16.92 \* 2,740 9.73 \* 0 0 0 0 0.00 \* 0 0.00 \* 15,478 0 0 15 472 - -Internal Loads Lights 0 0 0.00 0 People 0 0.00 Misc 0 0 0 0 0.00 \* 0 0.00 \* 0 15,478 0 0 15,478 43.73 \* 12,228 43.43 \* 0 105 -105 0 0.00 \* 105 0.37 \* -421 0 0 0 0 0.00 \* 0 0.00 \* 0 Misc 0
Sub Total==> 15,478 0 0.00 0 0.00 0 0.00 0 0.00 Ceiling Load Outside Air 711 2.01 \* Sup. Fan Heat 0.00 \* 0 Ret. Fan Heat 0 0.00 \* 0.00 \* 0.00 0.00 \* Duct Heat Pkup 0 0 0.00 \* 0 0.00 OV/UNDR Sizing 0 0.00 . 0 Exhaust Heat 0 0.00 Terminal Bypass 0.00 Grand Total==> 34,289 397 0 35,398 100.00 \* 28,158 100.00 \* -48,046 -49,645 100.00 Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 2,260 Main Clg 2.9 35.4 29.3 2,500 75.1 66.7 87.4 64.4 62.5 84.0 Part 0 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Aux Clg ExFlr 0 0.0 Roof 0 Opt Vent 0.0 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 0 0 Wall 928 Totals 2.9 35.4 124 13 Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 0.0 Type Clg Htg (Mbh) (cfm) Deg F Deg F Vent 0 0 Clg Cfm/Sqft 1.11 SADB 64.6 85.7 
 Infil
 399
 399
 Clg Cfm/Ton
 847.52

 Supply
 2,500
 2,500
 Clg Sqft/Ton
 766.15

 Mincfm
 0
 0
 Clg Btuh/Sqft
 15.66

 Return
 2,500
 2,500
 No. People
 10
 -49.6 2,500 67.4 85.7 Infil Main Htg Plenum 75.1 67.4 Aux Htg 0.0 0 0.0 0.0 Return 75.1 67.4 -0.0 0.0 Preheat 2,500 67.4 64.4 Ret/OA 75.1 67.4 0.0 0.0 No. People 10 Reheat ! Runarnd 75.0 68.0 0.0 0 0.0 0.0 Exhaust Humidif 0 - 0 Htg % OA 0.0 Fn MtrTD 0.1 0.0 0 0 Htg Cfm/SqFt 1.11 Fn BldTD 0.0 0 0 Htg Btuh/SqFt -21.97 Fn Frict 0.1 0 0.0 0.0 Rm Exh 0.0 Opt Vent 0.0 -49.6 Auxil Total

System 2 Peak SI - SINGLE ZONE

eaked at Time utside Air ==		Mo/Hr:     DB/WB/HR:		Λ		•	/Hr: ADB:			Mo/Hr: 13,		
	, 0,11	, , , , , , , , , , , , , , , , , , ,	71, 70, 70.	V		* Ui	HUD.	71 1	` (	OADB:	+	
	Space	Ret. Air	Ret. Air	Net	Percnt	* S;	pace	Percnt *	Space Pe	ak Coil Pe	eak	Perci
	Sens.+Lat.	Sensible	Latent	Total	Of Tot	* Sensi	ible	Of Tot *	Space Se			Of To
nvelope Loads	, ,	(Btuh)	(Btuh)	(Btuh)	(%)	* (B1	tuh)	(%) *	•			(१
Skylite Solr		0		. 0	0.00	<b>*</b>	0	0.00 *	•	Ó	Ó	0.0
Skylite Cond	0	0		0	0.00	*	0	0.00 *	:	0	0	0.0
Roof Cand	0	0		0	0.00	<b>t</b>	0	0.00 *	:	0	0	0.
Glass Solar	5,945	0		5,945	13.17	<b>*</b> 5,	945	16.57 *		0	0	0.
Glass Cond	1,051	0		1,051	2.33	<sup>‡</sup> 1,	051	2.93 *	-5,0	54 -5,0	)54	7.
Wall Cond	5,753	728		6,481	14.36	<b>*</b> ⋅5,	753	16.03 *	-21,4	•		36.
Partition	92	•		- 92	0.20	t .	92	0.26 *	-3.	•	331	0.
Exposed Floo				0	0.00	ķ	0	0.00 *		0	0	0.
Infiltration	•			14,663	32.49	¢ 9,	052	25.23 *	-37,3	75 <b>-37,</b> 3	375	55.1
Sub Total==>	,	728		28,232	62.55	<b>k</b> 21,	892	61.01 *		-		100.
nternal Loads					:	ķ .		*		,		
Lights	11,668	0		11,668	25.85	<sup>‡</sup> 11,	668	32.52 *		0	0	0.
People	4,690			4,690	10.39	2,	141	5.97 *		0	0	0.
Misc	0	0	0	0	0.00	t	0	0.00 *		0	0	٥.
Sub Total==>		0	0	16,359	36.24	13,	810	38.49 *		0	0	0.
eiling Load	179	-179		0	0.00	t .	179	0.50 *	-60	65	0	0.
⊥tside Air	0	0	0	0	0.00	ŧ	0	0.00 *		0	0	0.
up. Fan Heat				544	1.21			0.00 *			0	0.
et. Fan Heat	•	0		0	0.00			0.00 *			0	0.
uct Heat Pkup		0		0	0.00			0.00 *			0	0.
V/UNDR Sizing	0			0	0.00	ţ.	0	0.00 *		0	0	0.
xhaust Heat		0	0	• 0	0.00			0.00 *			0	0.
erminal Bypas	S	0	0	0	0.00			0.00 *			0	0.
rand Total==>	44,042	549	0	45 175	100.00		001	100.00 *		70 // 5		
and iotal/	44,042	347		45,135	100.00	· 35,	881	100.00 *	-64,83	30 -66,8	175	100.
										AREAS		
	al Capacity				ig DB/WB/HF				Gross Tota		(sf)	(%
(Tons		(Mbh)	(cfm)			-		Grains		2,849		
in Clg 3.		37.0	2,550	75.2 65				78.2	Part	128		
	0.0	0.0	0		0.0		0.0	0.0	ExFlr	0		
: Vent 0.		0.0	0	0.0 0	.0 0.0	0.0	0.0	0.0	Roof	0		0
als 3.	.8 45.1								Wall	1,248	149	9
HEAT	TING COIL SELE	CTION		AIR	FLOWS (cfm	)	8	ENGINEERING	CHECKS	TEMPERAT	URES I	(F)-
Capac					Cooling	Heating		% OA	0.0		Clg	Ht
	oh) (cfm		_	Vent	Ō	0	_	-	0.90		62.1	91
in Htg -6	56.9 2,5		-	Infil	537	537		Cfm/Ton			75.2	67
( Ht.g	0.0			Supply		2,550		Sqft/Ton			75.2	67
17	-0.0 2,5			Mincfm	0	0		Btuh/Sqft			75.2	67
neat -	0.0			Return	2,550	2,550	_	People	10		75.0	68
	V. V								_			
neat ;	0.0	0.0		Exhaust	0	- 0	Htc	3 % OA	0.0		0.0	0
neat; nidif			0.0	Exhaust Rm Exh	0	- 0 0		3 % OA 3 Cfm/SqFt	0.0 0.90	Fn MtrTD Fn BldTD	0.0	0

System 3 Block RAD - RADIATION

Peaked at Time ==> Mo/Hr: 0/0 \* Mo/Hr: 13/1 OADB: 0 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 4 Space Net Percnt \* Space Ret. Air Ret. Air Percnt \* Space Peak Coil Peak Percnt Sensible Latent Sens.+Lat. Total Of Tot \* Sensible Of Tot \* Space Sens Tot Sens Of Tot (Btuh) (%) \* (%) \* Envelope Loads (Btuh) (Btuh) (Btuh) (Btuh) (8tuh) (Btuh) (%) Skylite Solr 0 0 0 0.00 \* 0 0.00 \* 0 0 Ō 0.00 Skylite Cond 0 0 0 0.00 \* 0 0.00 \* 0 0.00 0 -170,485 8.87 0 0 0.00 0 Roof Cond 0 0 0.00 \* 0.00 \* 0 0 Glass Solar 0 0.00 \* 0.00 \* 0 Glass Cond 0 0.00 \* 0 0.00 \* -186,742 -186,742 9.72 Wall Cond 0 0.00 \* 0 0.00 \* -524,509 -581,696 30.28 0 0 0.00 \* 0.00 \* Partition -4,712 -4.7120.25 Exposed Floor 0 0 0.00 \* 0.00 \* . 0 0 0.00 0 0.00 \* -977,370 -977,370 50.88 Infiltration 0.00 \* Sub Total:=> 0 0 0 0.00 \* 0.00 \* -1,693,333 -1,921,006 100.00 Internal Loads \* 0 0.00 \* 0 0 Lights 0 0.00 \* 0 People 0 0.00 \* 0.00 \* 0 0 0.00 0 0 0.00 \* 0 Misc 0 0 0.00 \* 0.00 0 0 Sub Total::> 0 0.00 \* 0.00 \* 0 0 0.00 Ceiling Load 0 0 0 0.00 \* 0 0.00 \* -273.486 0 0.00 \* 0 Outside Air 0 0 0.00 \* 0.00 0 0.00 \* Sup. Fan Heat 0.00 \* 0.00 0 0.00 \* Ret. Fan Heat 0 0.00 \* Duct Heat Pkup 0 0.00 \* 0.00 \* 0.00 OV/UNDR Sizing 0 0.00 \* 0.00 \* 0 0.00 0 0.00 \* Exhaust Heat 0 0 0.00 \* 0.00 Terminal Bypass 0 0 0.00 \* Grand Total==> 0 0 0.00 \* 0.00 \* -1,966,819 -1,921,006 100.00 ------AREAS------AREAS------Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 79,849 0.0 0 0.0 0.0 1,820 Main Clg 0.0 0.0 0.0 0.0 0.0 0.0 Part 0.0 0.0 Aux Clg 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 ExFlr 0 Roof 27,566 Wall 32,636 0.0 Opt Vent 0.0 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 0 0 Totals 0.0 0.0 5,491 17 ------AIRFLOWS (cfm)------ -- ENGINEERING CHECKS-- -- TEMPERATURES (F)--------HEATING COIL SELECTION------Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 0.0 Type Clg Htg O Clg Cfm/Sqft (Mbh) (cfm) Deg F Deg F 0 0.0 68.1 Vent 0.00 SADB 0 0 Main Htg -1.921.0 0.0 0.0 Infil 14,033 Clg Cfm/Ton 0.00 Plenum 0.0 56.2 0 0.0 0.0 0 Aux Htg 0.0 Supply 0 Cla Saft/Ton 0.00 Return 0.0 66.0 O Clg Btuh/Sqft Mincfm Preheat 0.0 0 0.0 0.0 0 0.00 Ret/OA 0.0 66.0 O No. People O Runarnd
O Htg % DA O.O Fn MtrTD
O Htg Cfm/SqFt O.OO Fn BldTD
O Htg Btuh/SqFt -24.06 Fn Frict 0.0 Return Reheat 0.0 0 0.0 0 0.0 68.0 0.0 0.0 0.0 0.0 Exhaust 0 Humidif 0.0 0.0 Opt Vent 0.0 0.0 Rm Exh 0.0 0.0 Auxil 0 Total -1,921.0 0.0 0.0

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

------ BUILDING U-VALUES-----

			Room U-Values Room U-Values Room U-Values									Room Capac.	
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/	
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof		Windo	Wall	Ceil.	sqft)	sqft/F)	
3	POST NURSERY	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03	
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03	
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03	
4	POST NURSERY	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	75.2	16.49	
Zone	4 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	75.2	16.49	
System	<pre>2 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	75.2	16.49	
1	1ST FL APART'S	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	62.4	13.44	
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	62.4	13.44	
2	2ND FL APART'S	0.000	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	81.2	17.94	
Zone :	2 Total/Ave.	0.000	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	81.2	17.94	
3	POST NURSERY	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03	
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03	
5	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	67.7	15.04	
Zone	5 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	67.7	15.04	
System	3 Total/Ave.	0.144	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	70.3	15.43	
Buildin	g	0.144	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	70.3	15.40	

BUILDING AREAS - ALTERNATIVE 1 BASE BUILDING

BUILDING AREAS-----

Room Number	Description		er of icate Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
3	POST NURSERY	1	1	2,260	2,260	0	0	0	0	0	124	13	804
Zone	3 Total/Ave.				2,260	0	0	0	0	0	124	13	804
System	<pre>1 Total/Ave.</pre>				2,260	0	0 -	0	0	0	124	13	804
4	POST NURSERY	1	1	2,849	2,849	128	0	0	0	0	149	12	1,099
Zone	<pre>4 Total/Ave.</pre>				2,849	128	0	0	0	0	149	12	1,099
System	<pre>2 Total/Ave.</pre>				2,849	128	0	0	0	0	149	12	1,099
1	1ST FL APART'S	1	1	27,566	27,566	0	0	0	0	0	2,343	19	10,201
Zone	<pre>1 Total/Ave.</pre>				27,566	0	0	0	0	0	2,343	19	10,201
2	2ND FL APART'S	i	1	27,566	27,566	0	0	0	0	27,566	2,343	19	10,201
Zone :	<pre>2 Total/Ave.</pre>				27,566	0	0	0	0	27,566	2,343	19	10,201
3	POST NURSERY	1	1	2,260	2,260	0	0	0	0	0	124	13	804
Zone	3 Total/Ave.				2,260	0	0	0	0	0	124	13	804
5	BASEMENT	1	1	22,457	22,457	1,820	0	0	0	0	681	10	5,939
Zone	5 Total/Ave.				22,457	1,820	0	0	0	0	681	10	5,939
System	3 Total/Ave.				79,849	1,820	0	0	0	27,566	5,491	17	27,145
Buildin	g ·				84,958	1,948	0	0	0	27,566	5,764	17	29,048

ASHRAE 90 ANALYSIS - ALTERNATIVE 1 BAŞE BUILDING

----- ASHRAE 90 ANALYSIS------

Overall Roof U-Value = 0.146 (8tu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.372 (8tu/Hr/Sq Ft/F)
Overall Building U-Value = 0.272 (8tu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 10.03 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 15.06 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

### System Totals

Percent	Coo	ling Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours		Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.3	4	32	-101,876	7	. 290	252.5	0	0	0.0	0	0
5 - 10	0.7.	2	16	-203,753	9	405	505.0	0	0	0.0	0	0
10 - 15	1.0	3	20	-305,629	11	505	757.5	0	0	0.0	0	0
15 - 20	1.3	4	30	-407,505	10	430	1,010.0	0	0	0.0	. 0	0
20 - 25	1.7	15	113	-509,381	12	554	1,262.5	0	0	0.0	0	0
25 - 30	2.0	7	57	-611,258	13	575	1,515.0	0	0	0.0	0	0
30 - 35	2.3	4	32	-713,134	10	462	1,767.5	0	0	0.0	0	0
35 - 40	2.7	6	45	-815,010	10	464	2,020.0	0	0	0.0	0	0
40 -   45	3.0	3	22	-916,887	4	177	2,272.5	0	0	0.0	0	0
45 - 50	3.4	3	23	-1,018,763	3	119	2,525.0	0	0	0.0	0	0
50 - 55	3.7	6	45	-1,120,639	4	176	2,777.5	58	1,450	0.0	0	0
55 - 60	4.0	8	60	-1,222,516	3	114	3,030.0	0	0	0.0	0	0
60 - 65	4.4	1	4	-1,324,392	4	175	3,282.5	0	0	0.0	0	0
65 - 70	4.7	2	15	-1,426,268	0	0	3,535.0	0	0	0.0	0	0
70 - 75	5.0	. 5	35	-1,528,145	0	0	3,787.5	0	0	0.0	0	0
75 - 80	5.4	2	15	-1,630,021	0	0	4,040.0	0	0	0.0	0	0
80 -  85	5.7	0	0	-1,731,897	0	0	4,292.5	0	0	0.0	0	0
85 - 90	6.0	4	29	-1,833,774	0	0	4,545.0	0	0	0.0	0	0
90 - 195	6.4	1	4	-1,935.650	0	0	4,797.5	0	0	0.0	0	0
95 - 100	6.7	22	165	-2,037,526	0	0	5,050.0	42	1,070	0.0	0	0
Hours Off	0.0	0	7,998	0	0	4,314	0.0	0	6,240	0.0	0	8,760

Mo./Hr.

Day Type

2 7 2 7 4 4 3 21 1 14 1 4

2

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
BASE BUILDING

emperatur:							Zone Number
Rang (F		3 4	1	2	3	5	
Max. Temp	. 82.6	82.3	98.7	98.1	100.6	98.3	
Mo./Hr	. 7 1	7 24	8 23	8 23	8 20	8 16	
Day Typ	e 5	5 4	1	1	1	2	
							Number of Hours
Above 10		) 0	0	0	396	0	
95 - 10	) (	) 0	1,304				
90 - 9				590	1,280	1,190	
85 ~ 9				966	308	896	
80 - 8				352	330	173	
75 - 8	•	2,673		582		861	
70 - 7		1,032			351	269	
65 - 70							
60 - 6		1,238	0	0	1,264		
55 - 60				0	556	541	
50 <sub> </sub> - 5!		360	0	0	775	424	
Below 50	2,445	283	0	0	0	0	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING

------ MONTHLY ENERGY CONSUMPTION------------

Month	ELEC Off Peak (kWh)	DEMAND On Peak (k\)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	15,993	73	5,844	12
Feb	14,462	73	5,705	13
March	17,001	73	3,559	10
April	15,306	73	1,086	8
May	16,557	73	0	0
June	17,402	83	0	0
July	17,249	84	0	0
Aug	18,140	83	0	0
Sept	15,590	83	0	0
Oct	16,473	73	398	5
Nov ,	15,315	73	2,554	9
Dec	15,490	73	4,846	12
Total	194,976	84	23,992	13

Building Energy Consumption = 36,073 (Btu/Sq Ft/Year) Source Energy Consumption = 61,154 (Btu/Sq Ft/Year)

Floor Area = 84,958 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- EQUIPMENT ENERGY CONSUMPTION -----

	Equip Code	Jan	Feb	Mar		Mon	-			6	0~+	11	000	* 7.1.
1 111	Code	Jail	rev	ridi	Apr	May	June	July	Aug	Sep	0ct	Nov	Dec	Tota
0	LIGHTS	15001	147/0	1/001	15017	1/701	1/017	15700	1/001	15017	1/701	45043	45704	(00 /7
	ELEC PK	15891 72.3	14369 72.3	16891 72.3	15217 72.3	16391 72.3	16217 72.3	15390 72.3	16891 72.3	15217 72.3	16391 72.3	15217 72.3	15390 72.3	189,47 72.
	W704 I.B													
1	MISC LD ELEC	0	0	0	0	0	0	0	0	0	0	٨	0	ĺ
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.
2	MISC LD													
	GAS	0	0	0	. 0	0	0	0	0	0	0	0	0	(
	PK 	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	. 0	0	0	0	0	0	0	0	0	0	0	0	(
	PK !	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	(
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD	_	,											
	P HOTH20 PK	0 0.0	0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0
	ė v	V.U	<b>v.</b> 0	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	NISC LD	۸	۸	۸	^	۸	٥	۸	۸	٥	۸	٥	•	,
	P CHILL PK	0 0.0	0 0.0	0.0	. 0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0
	İ	***	***	V.V	0.0	0.0	0.0	0.0	V.V	V.V	0.0	0.0	0.0	V. (
1	EQ1161	•		CLD COND			770		***					
	ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	0.0	370 4.0	630 4.1	358 4.0	51 3.8	0 0.0	0 0.0	0 0.0	1,410 4.2
		0.0	0.0	۷.۷	0,0	V.V	4.0	. 4.1	4.0	5.0	V.V	0.0	0.0	4.1
1	ÉQ5200	•		ENSER FA			7.1		•.	_				
	ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	31 0.3	62 0.4	31 0.3	5 0.2	0.0	0 0.0	0 0.0	130 0.4
	1 10	٧.٧	٧.٧	۷.۷	V.V	V.V		V.4	V.5	V. L	<b>v.</b> v	0.0	0.0	
1	EQ5303			ROLS										•
	ELEC PK	0	0	0	0	0	66	60	69	14	0	0	0	209
	†	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161			CLD COND										
	ELEC	0	0	0	0	0	447	816	504	107	0	0	0	1,87
	PK	0.0	0.0	0.0	0.0	0.0	5.0	5.2	5.1	4.9	0.0	0.0	0.0	5.2
2	EQ5200	_		ENSER FA										
	ELEC	0	0	0	0	0	38	80	43	11	0	0	0	17.
	PK	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.4	0.3	0.0	0.0	0.0	0.5
	EQ5303-		CONT	ROLS										

	ne Air Condi Trane Custo	_		e Networl	k									V 600 Page 12
	IPMENT ENERGE BUILDING	Y CONSUMP	TION - AL	.TERNATI	VE 1									
	ELEC	0	0	0	0	0	66	60	69	34	0	0	0	229
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003		FC (	ENTRIF.	FAN C.V.									
	ELEC	0	0	0	0	94	94	86	98	86	0	0	0	458
	PK	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.4
2	EQ4003		FC (	ENTRIF.	FAN C.V.									
	ELEC	69	62	75	65	72	72	65	75	65	72	65	65	825
	PK	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
3	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2102		PURC	HASED DI	ST. HOT	WATER								
	P HOTH20	5844	5705	3559	1086	0	0	0	0	0	398	2554	4846	23,992
	PK 	12.5	12.9	10.4	8.1	0.0	0.0	0.0	0.0	0.0	5.2	9.3	11.5	12.9
1	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	34	31	34	24	0	0	0	0	0	10	33	34	200
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

•

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1

BASE BUIL	DING					
		UIILI	TYPEAK	CHE	CKSUM	3
Utility	ELECTRIC DE	MAND				
	ie 83.8 me of Peak	(kW) L6 (hr) 7 (mo)				
Hour 16		· · · · · · · · · · · · · · · · · · ·				
Eqp.			,	Utility	Percnt	
	Equipment		·		Of Tot	
Num.	Code Name	Equipment De	escription	(kW)	(%)	
Cooling E	quipment					
1	EQ1161	AIR-CLD COND COMP <15 TONS AIR-CLD COND COMP <15 TONS		4.7	5.66	
2	EQ1161	AIR-CLD COND COMP <15 TONS		6.0	7.12	
Sub Total				10.7	12.78	
Sub Total				0.0	0.00	
Air Movin	g Equipment					
1		SUMMATION OF FAN ELECTRICAL DE	MAND	0.4	0.51	
2		SUMMATION OF FAN ELECTRICAL DE		0.3	0.39	
Sub Total				0.8	0.90	
Sub Total				0.0	0.00	
Miscelland	Bous					
Lights				72.3	86.32	
Base Util				0.0	0.00	
Misc Equi	ipment				0.00	
Sub Total		•		72.3	86.32	
Grand Tota	al			83.8	100.00	

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 116

```
Weather File Code:
                                 CARLISLE
 Location:
                                 ENERGY SAVINGS OPPORTUNITY STUDY
 Latitude:
                                40.2 (deg)
 Longitude:
                                 77.2 (deg)
 Time Zone:
                                    5
 Elevation:
                                  475 (ft)
 Barometric Pressure:
                                  29.2 (in. Hg)
Summer Clearness Number:
                                 1.00
Winter Clearness Number:
                                 1.00
Summer Design Dry Bulb:
                                 92 (F)
Summer Design Wet Bulb:
                                  72 (F)
Winter Design Dry Bulb:
                                    4 (F)
Summer Ground Relectance:
                                 0.20
Winter Ground Relectance:
                                 0.20
Air Density:
                               0.0742 (Lbm/cuft)
Air Specific Heat:
                               0.2444 (8tu/lbm/F)
Density-Specific Heat Prod:
                               1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor:
                              4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor:
                               4.4519 (Lb-min./hr/cuft)
Design Simulation Period: May
                                   To September
System Simulation Period: January To December
Cooling Load Methodology:
                              CLTD/CLF (Transfer Function Method)
Time/Date Program was Run:
                               10:15:27
                                        1/21/94
Dataset Name:
                                  C8116 .TM
```

AIRFLOW - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

Chesign Airflow Quantities)

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	0	2,500	2,500	2,853	353	0	0
2	SZ	. 0	2,550	2,550	3,024	474	0	0
3	RAD	0	0	0	0	12,402	0	0
Totals		0	5,050	5,050	5,877	13,229	0	0

CAPACITY - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

(Design Canacity Quantities)

(Design Capacity Quantities)

System Number	System Type	Main Sys. Capacity (Tons)	Aux. Sys.	•	Cooling Totals (Tons)	Main Sys. Capacity (8tuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Heating Reheat Capacity (Btuh)		Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	SZ	2.9	0.0	0.0	2.9	-46,413	0	0	0	0	0	-46,413
2	SI	3.6	0.0	0.0	3.6	-62,529	0	0	0	0	. 0	-62,529
\$	RAD	0.0	0.0	0.0	0.0	-1,807,358	0	0	0	0	0	-1,807,358
Totals		6.5	0.0	0.0	6.5	-1,916,300	0	0	0	0	0	-1,916,300

The building peaked at hour 16 month 7 with a capacity of 6.5 tons

ENGINERING CHECKS - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

			Percent	i	Cooli	ing		Heat	ing	
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	8tuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/.Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
ļ										
1	Main	SZ	0.00	1.11	874.5	790.5	15.18	1.11	-20.54	2,260
2	Main	SZ	0.00	0.90	702.2	784.6	15.30	0.90	-21.95	2,849
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-22.63	79,849

System 1 Peak SZ - SINGLE ZONE

	at Time ==:		Mo/Hr:		ā			o/Hr:			Mo/Hr: 13/	1
UU LS 1 GE	Alr ==>	UA	DB/WB/HR:	91/ /3/ 98.	.0		*	OADB:	91 1	<b>t</b>	OADB: 4	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Space	Percnt *	· Space Peak	Coil Pea	k Percn
		ens.+Lat.	Sensible		Total	Of Tot	* Sen	sible	Of Tot *	•		
	e Loads		(Btuh)	(Btuh)	(Btuh)	(%)	* (	Btuh)	(%) *	(Btuh)	) (Btuh	
		0	0		0	0.00	*	0	0.00 *		_	0.00
	te Cond	0	0		. 0	0.00	*	0	0.00 *	: (	) (	0.00
Roof		0	0		0	0.00	*	0	0.00 *	: 0	) (	0.00
	Solar		0		4,331			4,331	15.82 *	: 0	) (	0.00
Glass		882	0		882	2.57		882	3.22 *	-4,208	-4,208	9.07
		3,882	502		4,384	12.78		3,882	14.18 *		-17,64	38.02
Parti		0			0	0.00		0	0.00 *			
	ed Floor	0			0			0	0.00 *			
	tration	8,522			8,522				21.73 *	,	-24,560	
Internal		17,616	502		18,118	52.81		5,043	54.95 *	,	-46,413	3 100.00
		9,487	^	·	0 (07	07 (5	*		*			
Lights People		5,990	0		9,487			9,487	34.66 *			
Misc	,	3,770	0	۸	5,990	17.46		2,740	10.01 *			
	tal==>	_	0		15 470			0	0.00 *			
Ceiling		105	-105	•	15,478 0	45.12 0.00		2,228 105	44.67 *			
Outside		0	0		0	0.00		103	0.38 * 0.00 *			
Sup. Far		•	V	V	711	2.07		V	0.00 *		· (	
Ret. Far			0		0	0.00			0.00 *		(	0.00 0.00
Duct Hea			0		. 0	0.00			0.00 *		. (	0.00
OV/UNDR		0			0	0.00		0	0.00 *			0.00
Exhaust	-		0	0	0	0.00		•	0.00 *		(	
Terminal	Bypass	•	0	0	0	0.00			0.00 *		-	0.00
							*		*			
Grand To	tal==>	33,199	397	0 -	34,307	100.00	* 27	,375	100.00 *	-44,815	-46,413	100.00
			C00I	LING COIL S	ELECTION		· - <b>-</b>				AREAS	
ı	Total C	apacity	Sens Cap.	Coil Airfl	Enterin	g DB/WB/H	ir Lea	ving D	B/WB/HR	Gross Total		sf) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg	F Grain	ns Deg F	Deg F	Grains	Floor 2		, , ,
lain Clg	2.9			2,500	75.1 66	.7 87.	3 64.7	62.6	84.0	Part	0	
ux Clg	0.0	0.0	0.0	0		.0 0.		0.0		ExFlr	0	
pt Vent	0.0	0.0	0.0	0	0.0 0	.0 0.	0.0	0.0	0.0	Roof	0	0 0
otals	2.9	34.3								Wall	928	124 13
	HEATING	COIL SELE	CTION		AIR	FLOWS (cf	m)		ENGINEERING	CHECKS	TEMPERATUR	ES (F)
;	Capacity	Coil Ai	rfl Ent	Lvg		Cooling	Heating		g % OA	0.0	Type Cl	
	(Mbh)	(cfm	) Deg f	Deg F	Vent	0			g Cfm/Sqft			.9 84.5
ain Htg	-46.4	,		84.5	Infil	353	353		g Cfm/Ton			.1 67.4
ux Htg	0.0		0.0	0.0	Supply	2,500	2,500		g Sqft/Ton			.1 67.4
reheat	-0.0	•		64.7	Mincfm	0	C		g Btuh/Sqft		Ret/OA 75	
<b>e</b> heat	0.0		0.0	0.0	Return	2,500	2,500	No	. People		Runarnd 75	
umidif	0.0		0.0	0.0	Exhaust	0	C	Ht	g % OA			.1 0.0
pt Vent	0.0		0.0	0.0	Rm Exh	0	0	. Ht	g Cfm/SqFt	1.11	Fn BldTD 0	.0 0.0
otal	-46.4				Auxil		•		g Btuh/SqFt		, 514.5	

System 2 Peak SZ - SINGLE ZONE

	at Time ==		Mo/Hr: 7	//16	^	1		•			Mo/Hr: 13/ 1	
Juisiae	H17>	UA	DB/WB/HR: 9	91/ /3/ 98.	U	; ;	: O	AD8:	91 *		OADB: 4	
		Space	Ret. Air	Ret. Air	Net	Percnt *	s \$	pace	Percnt *	Space Peak	Coil Peak	Percn
	S	ens.+Lat.	Sensible	Latent	Total	Of Tot *	Sens	ible	Of Tot *	Space Sens	Tot Sens	Of To
Envelope	e Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	: (B	tuh)	(%) *	(Btuh)	(Btuh)	(%
Skylit	te Solr	0	0		0	0.00		0	0.00 *	0	0	
Skylit	te Cond	0	0		0	0.00		0	0.00 *	0	0	0.0
Roof (	Cond	0	0		0	0.00		0	0.00 *	0	0	0.0
Glass	Solar	5,945	0		5,945	13.64	5	,945	17.07 *	0	0	0.0
Glass	Cond	1,051	0		1,051	2.41 *	1	,051	3.02 *	-5,054	-5,054	8.0
Wall (	Cond	5,753	728		6,481		5	,753	16.52 *		-24,114	
Partit	tion	92			92	0.21 *		92	0.26 *	-331	-331	0.5
Expose	ed Floor	0			0			0	0.00 *	0	0	0.0
Infilt	tration	13,104			13,104	30.07 *	7	,999	22.97 *	-33,029	-33,029	52.8
	otal==>	25,945	728		26,673	61.21		,840	59.84 *		-62,529	
[nterna]				•		*			*		•	
Lights		11,668	0		11,668	26.78 *	11	,668	33.50 *	0	0	0.0
People	)	4,690			4,690	10.76 *	2	,141	6.15 *	0	0	0.0
Misc		0	0	0	0	0.00 *		0	0.00 *	0	0	0.0
Sub, To	tal==>	16,359	0	0	16,359	37.54 *	13	,810	39.65 *	0	0	0.0
Ceiling	Load	179	-179		0	0.00 *		179	0.51 *	-665	0	0.0
lutside	Air	0	0	0	0	0.00 *		0	0.00 *	0	0	0.0
Sup. Far	n Heat				544	1.25 *			0.00 *		0	0.0
let. Far			0		0	0.00 *			0.00 *		0	0.0
uct Hea			0		. 0	0.00 *			0.00 *		. 0	0.0
V/UNDR	-	0			0	0.00 *		0	0.00 *	0	0	-0.0
xhaust			0	0	0	0.00 *			0.00 *		0	0.0
erminal	Bypass	·	0	0	0	0.00 *			0.00 *		0	0.0
		40 400	r.10	•	47 57/	*	7.1	200	*			
irand lo 	ital==>	42,482	549	0	45,5/6	100.00 *	54	,828	100.00 *	-60,484	-62,529	100.0
			C00L									
										Gross Total		sf) (%)
	(Tons)		(Mbh)						Grains		,849	
			35.9							Part	128	
x Clg	0.0	0.0	0.0	0		0.0		0.0		ExFlr	0	
t Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		0	0
tals	3.6	43.6				-				Wall 1	,248	149
	HEATIN	G COIL SELE	ECTION		AIR	IFLOWS (cfm	)		ENGINEERING	CHECKS	TEMPERATUR	ES (F)
	Capacit	-		Lvg	Type	Cooling	Heating	Cl	g % OA	0.0	Type Cl	g Ht
	(Mbh)	•	n) Deg F	Deg F	Vent	0	. 0	Cl	g Cfm/Sqft	0.90	SAD8 62	-
in Htg	-62.	•		89.8	Infil	474	474	Cl	g Cfm/Ton	702.23	lenum 75	
x Htg	0.		0.0	0.0	Supply	2,550	2,550		g Sqft/Ton		Return 75	
eheat	-0.				Mincfm	0	0		g Btuh/Sqft	15.30	Ret/OA 75	.2 67
heat	0.		0 0.0	0.0	Return	2,550	2,550	No	. People	10	Runarnd 75	.0 68
midif	0.		0.0	0.0	Exhaust	0	0	Ht	g % OA		n MtrTD 0	.0 0
t Vent	0.	0	0.0	0.0	Rm Exh	0	0	Ht	g Cfm/SqFt	0.90	n BldTD 0	.o <b>o</b> .
tal	-62.	_			Auxil	0		Ht				

System 3 Block RAD - RADIATION

	at Time ==:		Mo/Hr: (		•				/Hr: (			Mo/Hr:		
outside	Air ==>	UAI	OB/WB/HR:	0/ 0/ 0	.0		; ;	· 0	ADB:	0 *		OADB:	4	
		Space	Ret. Air	Ret. Air		Net Pe	rent *	s S	pace	Percnt *	Space Pe	eak Coil	Peak	Percn
	Se	ens.+Lat.	Sensible	Latent	To	tal Of	Tot *	Sens	ible	Of Tot *			Sens	Of To
Envelop	e Loads	(Btuh)	(Btuh)	(Btuh)	(Bt	uh)	(%) *	: (B	tuh)	(%) *			Btuh)	(\$
-	te Solr	0	0			0	0.00 *		0	0.00 *		0	Ó	0.0
	te Cond	0	0			0	0.00 *	•	0	0.00 *		0	0	0.0
Roof		0	0			0	0.00 *		0	0.00 *		0 -17	0,485	9.4
	Solar	0	0			0	0.00 *		0	0.00 *		0	0	0.0
Glass		0	0			0	0.00 *		0	0.00 *	-186,7	742 -18	6,742	10.3
Wall		0	0			0	0.00 *		0	0.00 *	-524,5	509 -58	1,696	32.1
Parti		0				0	0.00 *		0	0.00 *		712 -	4,712	0.2
	ed Floor	0				0	0.00 *		0	0.00 *		0	0	0.0
	tration	0				0	0.00 *		0	0.00 *	-863,7		3,723	47.7
	otal==>	0	0			0	0.00 *		0	0.00 *		86 -1,80		100.0
Internal							*			*		•		
Lights		0	0			0	0.00 *		0	0.00 *		0	0	0.0
People	3	0				0	0.00 *		0	0.00 *		0	0	0.0
Misc		0	0	0		0	0.00 *		0	0.00 *		0	0	0.0
Sub <sub>i</sub> To	otal==>	0	0	0		0	0.00 *		0	0.00 *		0	0	0.00
Ceiling		0	0			0	0.00 *		0	0.00 *	-273,4	186	0	0.0
Dutside	Air	0	0	0		0 1	0.00 *		0	0.00 *		0	0	0.0
Sup. Fai						0	0.00 *			0.00 *			0	0.0
Ret. Far			0			0 (	0.00 *			0.00 *			0	0.00
Duct Hea			0			0	0.00 *			0.00 *		-	0	0.00
DV/UNDR	-	0				0 (	0.00 *		0	0.00 *		0	0	0.00
Exhaust			0	0		0	0.00 *			0.00 *			0	0.0
[ermina]	Bypass		0	0		0 (	0.00 *			0.00 *	,		0	0.0
arand To	tal==>	0	0	0		0 (	* * 0.00		0	* 0.00 *		71 -1,80	7.358	100.0
			0001	****										
			COOL Sens Cap.					1 0 21		/WB/HR	Gross Tot			
1	(Tons)		(Mbh)			Deg F			-	Grains		79,849	ass (sf	) (6)
ain Clg			0.0		•						Part			
ıx Clg	0.0	0.0	0.0	0	. 0.0	0.0	0.0		0.0	0.0		1,820		
ot Vent	0.0	0.0	0.0	0	0.0	0.0	0.0		0.0	0.0		27,566		0
tals	0.0	0.0	•••	•	•.•	***		V. 0	0.0	0.0		32,636	5,4	
	HEATING	COIL SELE	CTION		******	-AIRFLOW	VS (cfm	)	E	NGINEERING	CHECKS	TEMPE	RATURES	(F)
	Capacity	Coil Ai	rfl Ent	Lvg	Туре		ling	Heating		% OA	0.0	Туре	Clg	Htg
	(Mbh)	(cfm		Deg F	Vent		•	. 0	-	Cfm/Sqft	0.00	SADB	0.0	
ain Htg	-1,807.4		0.0	0.0	Infil		0	12,402		Cfm/Ton		Plenum	0.0	
ıx Htg	0.0		0.0	0.0	Supply		0	0		Sqft/Ton	0.00	Return	0.0	
eheat	0.0		0.0	0.0	Mincfm		0	0	Clg	Btuh/Sqft		Ret/OA	0.0	
heat:	0.0		0.0	0.0	Return		0	0		People	0	Runarnd		
umidif	0.0		0.0	0.0	Exhaust		0	0		% OA		Fn MtrT		
t Vent	0.0		0.0	0.0	Rm Exh		0	0		Cfm/SqFt		Fn BldT		
tal	-1,807.4				Auxil		0			Btuh/SqFt		Fn Fric		0.

BUILDING U-VALUES - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

------ BUILDING U-VALUES -----

												Room Capac.	
Room Number	Description	Part.	ExFlr	Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.	(lb/ sqft)	(Btu/ sqft/F)	
3	POST NURSERY	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03	
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03	
System	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03	
4	POST NURSERY	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	75.2	16.49	
Zone	4 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	75.2	16.49	
System	<pre>2 Total/Ave.</pre>	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	75.2	16.49	
1	1ST FL APART'S	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	62.4	13.44	
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	62.4	13.44	
2	2ND FL APART'S	0.000	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	81.2	17.94	
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	81.2	17.94	
3	POST NURSERY	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03	
Zone :	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03	
\$	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	67.7	15.04	
Zone :	5 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	67.7	15.04	
System	3 Total/Ave.	0.144	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	70.3	15.43	
Buildin	g	0.144	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	70.2	15.40	

BUILDING AREAS - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

Room		Dupl	er of	Floor Area/Dupl Room	Total Floor Area	Partition Area	Exposed Floor Area	Skylight Area	Skl /Rf	Net Roof Area	Window Area	Win /Wl	Net Wall Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
3	POST NURSERY	1	1	2,260	2,260	0	0	0	0	0	124	13	804
Zone	3 Total/Ave.				2,260	0	0	0	0	0	124	13	804
System	1 Total/Ave.				2,260	0	. 0	0	0	0	124	13	804
4	POST NURSERY	i	1	2,849	2,849	128	0	0	0	0	149	12	1,099
Zone	4 Total/Ave.				2,849	128	0	0	0	0	149	12	1,099
System	2 Total/Ave.				2,849	128	0	0	0	0	149	12	1,099
1	1ST FL APART'S	1	1	27,566	27,566	0	0	0	0	0	2,343	19	10,201
Zone	1 Total/Ave.			•	27,566	0	0	0	0	0	2,343	19	10,201
2	2ND FL APART'S	1	1	27,566	27,566	0	0	0	0	27,566	2,343	19	10,201
Zone	<pre>2 Total/Ave.</pre>				27,566	0	0	0	0	27,566	2,343	19	10,201
3	POST NURSERY	1	1	2,260	2,260	0	0	0	0	0	124	13	804
Zone	3 Total/Ave.				2,260	0	0	0	0	0	124	13	804
\$	BASEMENT	1	1	22,457	22,457	1,820	0	0	0	0	681	10	5,939
Zone	5 Total/Ave.				22,457	1,820	0	0	0	0	681	10	5,939
System	3 Total/Ave.				79,849	1,820	0	0	0	27,566	5,491	17	27,145
Buildin	g				84,958	1,948	0	0	0	27,566	5,764	17	29,048

ASHRAÉ 90 ANALYSIS - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

----- A S H R A E 9 O A N A L Y S I S -----

Overall Roof U-Value = 0.146 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.372 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.272 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 10.03 (8tu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVW) = 15.06 (8tu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

#### System Totals

Percent	Coo	ling Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.			Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.3	8	64	-95,815	6	271	252.5	0	0	0.0	0	0
5 - 10	0.6	2	16	-191,630	8	364	505.0	0	0	0.0	0	0
10 - 15	1.0	0	0	-287,445	12	535	757.5	0	0	0.0	0	0
15 - 20	1.3	6	46	-383,260	10	450	1,010.0	0	0	0.0	0	0
20 - 25	1.6	10	84	-479,075	13	556	1,262.5	0	0	0.0	0	0
25 - 30	1.9	8	61	-574,890	12	520	1,515.0	0	0	0.0	0	0
30 - 35	2.3	2	16	-670,705	11	485	1,767.5	0	0	0.0	0	0
35 - 40	2.6	7	57	-766,520	11	461	2,020.0	0	0	0.0	0	0
40 - 45	2.9	7	53	-862,335	4	160	2,272.5	0	0	0.0	0	0
45 - 50	3.2	3	23	-958,150	3	117	2,525.0	/ 0	0	0.0	0	0
50 - ;55	3.6	5	40	-1,053,965	4	177	2,777.5	58	1,450	0.0	0	0
55 - 60	3.9	8	68	-1,149,780	4	190	3,030.0	0	. 0	0.0	0	0
60 - 65	4.2	0	0	-1,245,596	2	95	3,282.5	0	0	0.0	0	0
65 - 170	4.5	2	15	-1,341,411	0	0	3,535.0	0	0	0.0	0	0
70 - 75	4.9	4	34	-1,437,226	0	0	3,787.5	0	0	0.0	0	0
75 - 80	5.2	4	30	-1,533,041	0 -	0	4,040.0	0	0	0.0	. 0	0
80 - 85	5.5	0	0	-1,628,856	0	0	4,292.5	0	0	0.0	0	0
85 - 90	5.8	1	5	-1,724,671	0	0	4,545.0	0	0	0.0	0	0
90 - 95	6.2	1	5	-1,820,486	0	0	4,797.5	0	0	0.0	0	0
95 - 100	6.5	24	193	-1,916,301	0	0	5,050.0	42	1,070	0.0	0	0
Hours Off	0.0	0	7,950	0	. 0	4,379	0.0	0	6,240	0.0	0	8,760

## BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

					BUI	LDI	NG TEMPERATURE PROFILES
I							
Temperature							Zone Number
Range (F)	3	4	1	2	3	5	
Max. Temp.	82.8	82.5	98.7	98.1	100.6	98.3	
Mo./Hr.	7 2				8 20		
Day Type	5						
							Number of Hours
Above 100	0	0	0	0	396	0	
95 - 100	0	0	1.304	1,216		-	
90 - 95	0				1,280		
85 - 90	0	0					
80 - 85	619	421	232				
75 - 80		2,844	631				
70 - 75	1,111					264	
65 <sup>'</sup> - 70		2,398					
60; - 65	701				1,309		
55 - 60	826	542	0		480		
50 - 55	721	345	0	0	726	378	
Below 50	2,348	233	0	0	0	0	
Min. Temp.	34.4	44.9	67.9	67.9	54.9	54.9	
Mo./Hr.	2 7	2 7	1 7	1 19			
Day Type	5	5	1	2	3	4	
1							

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

------ MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	15,991	73	5,469	12
Feb	14,460	73	5,318	12
March	16,999	73	3,278	10
April	15,303	73	927	8
May	16,557	73	0	0
June	17,439	83	0	0
July	17,239	83	0	0
Aug	18,168	83	0	0
Sept	15,645	82	0	0
Oct	16,471	73	. 331	4
Nov	15,313	73	2,378	9
Dec	15,488	73	4,547	11
Total	195,072	83	22,246	12

Building Energy Consumption = 34,022 (Btu/Sq Ft/Year)
Source Energy Consumption = 58,426 (Btu/Sq Ft/Year)

Floor Area = 84,958 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

----- EQUIPMENT ENERGY CONSUMPTION------

ef Eq							thly Cons							
um Co	ode	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
0 LI														
	.EC	15891	14369	16891	15217	16391	16217	15390	16891	15217	16391	15217	15390	189,471
.bK		72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3
1 MI	SC LD						*							
EL	.EC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	,	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 MIS	SC LD													
GAS		0	0	0	. 0	0	0	0	0	0	0	0	0	0
PΚ		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
 5 MIS	SC LD													
011		0	0	0	0	0	0	0	0	0	0	0	0	0
PΚ		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MIS	SC LD													
Р 9	STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
PK		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MIS	SC LD													
PΙ	HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	0
ÞΚ		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MIS	SC LD					•								
PC	CHILL	0	0	0	. 0	0	0	0	0	0	0	0	0	0
ÞΚ		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EQ1	1161		AIR-	CLD COND	COMP <1	5 TONS								
ELE	EC	0	0	0	0	. 0	386	628	371	66	0	0	0	1,451
PK		0.0	0.0	0.0	0.0	0.0	3.8	4.0	3.8	3.7	0.0	0.0	0.0	4.0
EQ5	5200		COND	ENSER FA	NS									
ELE	EC	0	0	0	0	0	33	61	32	7	. 0	0	0	133
PΚ		0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.3	0.2	0.0	0.0	0.0	0.4
EQ5	5303		CONT	ROLS										
ELE	EC	0	0	0	0	0	66	60	69	19	0	0	0	214
PK		0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
EQ1			AIR-	CLD COND	COMP <1	5 TONS								
ELE	EC	0	0	0	0	0	466	809	518	130	0	0	0	1,923
PK		0.0	0.0		0.0	0.0	4.9	5.0	4.9	4.7	0.0	0.0	0.0	5.0
EQ5	5200		COND	ENSER FAI	NS.									
ELE		0	0	0	0	0	39	79	44	12	0	0	0	174
PK !		0.0		0.0	0.0	0.0	0.4	0.5	0.4	0.3	0.0	0.0	0.0	0.5
EQ5	5303		CONT	2015										

	ne Air Condi Trane Custo	_		e Network										V 600 Page 25
	PMENT ENERG		TION - AL	.TERNATIV	E 2									
	ELEC	0	0	0	0	0	66	60	69	43	0	0	0	238
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003		FC C	ENTRIF.	FAN C.V.									•
	ELEC	0	0	0	0	94	94	86	98	86	0	0	0	458
	PΚ	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.4
2	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	69	62	75	65	72	72	65	75	65	72	65	65	825
	PK	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
3	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2102		PURC	HASED DI	ST. HOT	√ATER								
	P HOTH20	5469	5318	3278	· 927	0	0	0	0	0	331	2378	4547	22,246
	PK	11.6	12.1	9.7	7.5	0.0	0.0	0.0	0.0	0.0	3.6	8.7	10.8	12.1
1	EQ5020		HEAT	₩ATER C	IRC. PUM	C.V.								
	ELEC	32	29	32	20	0	0	0	0	0	8	31	32	185
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

## UTILITY PEAK CHECKSUMS - ALTERNATIVE 2 WEATHERSTRIP & CAULKING

		UTILITY PEAK	с и с і	
			. Спе	r 2 n u 2
Utility	ELECTRIC DE	MAND		
Peak Valu Yearly Ti		(kW) 16 (hr) 7 (mo)		
Hour 16 !	Month 7			
Eap.			Utility	Percnt
	Equipment			Of Tot
Num.	Code Name	Equipment Description	(kW)	(%)
Cooling Ed	quipment			•
1	EQ1161	AIR-CLD COND COMP <15 TONS	4.6	5.52
2	EQ1161	AIR-CLD COND COMP <15 TONS	5.8	6.91
Sub Total			10.4	12.43
Sub Total			0.0	0.00
ir Moving	g Equipment			
1 .		SUMMATION OF FAN ELECTRICAL DEMAND	0.4	0.51
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.3	0.39
Sub Total			0.8	0.91
Sub Total			0.0	0.00
iscellane	ous			
Lights			72.3	86.67
Base Util			0.0	0.00
Misc Equi	pment			0.00
ub Total		•	72.3	
and Tota	1		83,4	100.00

Building 118

Trace Input File

```
CONTENTS OF : E:\CB118.TM
LINE # -----
  1
       JOB - 1
  2
       01/ENERGY SAVINGS OPPORTUNITY STUDY
   3
       01/CARLISLE BARRACKS, PA
   4
       01/DEPARTMENT OF THE ARMY
   5
       01/BENATEC ASSOCIATES
   6
       01/BUILDING 118
   7
       08/CARLISLE
  8
       09/JUL/JUL/19///APR/OCT
  9
       10/CLTD-CLF
 10
       11///ZONE
 11
       LOAD - 1
 12
       19/1/BASE BUILDING
 13
       20/1/1/MANAGERS OFFICE/200/1/1/7/.39/17
 14
       20/2/1/LOBBY/214/1/1/3/.39/21
 15
       20/3/1/LOUNGE/114/1/1/7/.39/17
 16
       20/4/1/MENS TOILET/39/1/1/7/.39/17
 17
       20/5/1/WOMENS TOILET/41/1/1/7/.39/17
 18
       20/6/2/FOYER & HALLWAYS/329/1/1/5/.39/23.5
       20/7/2/AUDITORIUM/2461/1/1/5/.39/25.5
 19
 20
       20/8/3/STAGE/828/1/1/5/.39/23.5
       21/M///CBTHTX///CBTHTX
 21
 22
       22/1/1/N0/18.75/12//150/122/65
 23
       22/2/1/N0/14/10.5//150/122/65
 24
       22/2/2/N0/14/10.5//150/302/65
 25
       22/3/1/N0/10.7/12//150/302/65
 26
       22/4/1/N0/7.75/5.5//150/302/65
 27
       22/5/1/N0/7.75/5.8//150/302/65
 28
       22/6/1/N0/175/1//150/122/65
 29
       22/6/2/N0/175/1//150/302/65
 30
       22/7/1/N0/53.5/24//150/122/65
 31
       22/7/2/N0/53.5/24//150/302/65
 32
       22/8/1/N0/17/24//150/122/65
 33
      22/8/2/NO/17/24//150/302/65
 34
      24/1/1/18.75/9.5//169/122
 35
      24/1/2/10.75/9.5//169/212
      24/2/1/15/17.5//169/212
 36
 37
      24/3/1/10.75/9.5//169/212
 38
      24/3/2/10.75/9.5//169/302
 39
      24/4/1/7.75/9.5//169/302
 40
      24/6/1/7/18//170/122
 41
      24/6/2/150/1//170/212
 42
      24/6/3/7/18//170/302
      24/7/1/53.5/20//170/122
 43
 44
      24/7/2/53.5/20//170/302
 45
      24/8/1/17.5/18//169/302
 46
      24/8/2/46/18//169/32
 47
      24/8/3/17.5/18//169/122
 48
      25/1/1/3.5/2.5/2/.58/.57
 49
      25/2/1/109/1/1/.65/.88
 50
      25/3/2/3.5/2.5/1/.58/.57
      25/4/1/3.5/2.5/1/.58/.57
 51
 52
      26/M/CBTHP/CBTHL/CBTHFAN//OFF/CBTHFAN/OFF/OFF/OFF
 53
      27/1/2/PEOPLE/230/190/1.5/WATT-SF
 54
      27/2////1.5/WATT-SF
 55
      27/3////1.5/WATT-SF
 56
      27/4////1.5/WATT-SF
 57
      27/5////1.5/WATT-SF
 58
      27/6////1.5/WATT-SF
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CONTENTS OF : E:\CB118.TM
LINE #
  59
       27/7/200/PEOPLE/210/140/0/WATT-SF
  60
       29/1/////.29/CFM-SF
  61
       29/2/////.29/CFM-SF
  62
       29/3/////.29/CFM-SF
       29/4/////.29/CFM-SF
  63
  64
       29/5//////.29/CFM-SF
  65
       29/6/10/PCT-MCLG/10/PCT-MHTG/.29/CFM-SF/.29/CFM-SF
  66
       29/7/10/PCT-MCLG/10/PCT-MHTG/.29/CFM-SF/.29/CFM-SF
  67
       29/8/////.29/CFM-SF
  68
       30/6/3.58/CFM-SF/3.58/CFM-SF
  69
       30/7/3.58/CFM-SF/3.58/CFM-SF
  70
       SYSTEM - 1
  71
       39/1/BASE BUILDING
  72
       40/1/RAD
  73
       41/1/1/1/3/3
  74
       42/1
 75
       44/1
 76
       45/1/OFF/OFF/OFF/OFF/OFF/CBTHHTG/OFF/OFF/OFF/OFF
  77
       40/2/SZ
  78
       41/2/2/2
  79
       42/2/.5
  80
       44/2/DRY-BULB/65/100
  81
       45/2/CBTHCLG/AVAIL/OFF/OFF/OFF/CBTHHTG/OFF/OFF/OFF
 82
       EQUIPMENT - 1
 83
       59/1/CARLISLE///BASE BUILDING
 84
       60/1/1/BLKPLANT/2/2
  85
       62/1/EQ1170L/1
 86
       65/1/1//1/2
 87
       67/1/EQ2102/1
 88
       69/1
 89
       69/2/EQ4003
 90
       LOAD - 2
       19/2/WALL & ROOF INSULATION
 91
 92
       20/1/1/MANAGERS OFFICE/200/1/1/7/.39/17
 93
       20/2/1/LOBBY/214/1/1/3/.39/21
 94
       20/3/1/LOUNGE/114/1/1/7/.39/17
       20/4/1/MENS TOILET/39/1/1/7/.39/17
 95
 96
       20/5/1/WOMENS TOILET/41/1/1/7/.39/17
       20/6/2/FOYER & HALLWAYS/329/1/1/5/.39/23.5
 97
 98
       20/7/2/AUDITORIUM/2461/1/1/5/.39/25.5
 99
       20/8/3/STAGE/828/1/1/5/.39/23.5
100
       21/M///CBTHTX///CBTHTX
101
       22/1/1/N0/18.75/12//185/122/65
102
       22/2/1/N0/14/10.5//185/122/65
103
       22/2/2/N0/14/10.5//185/302/65
104
       22/3/1/N0/10.7/12//185/302/65
105
       22/4/1/N0/7.75/5.5//185/302/65
106
       22/5/1/N0/7.75/5.8//185/302/65
107
       22/6/1/N0/175/1//185/122/65
108
       22/6/2/N0/175/1//185/302/65
109
       22/7/1/NO/53.5/24//185/122/65
110
       22/7/2/N0/53.5/24//185/302/65
111
       22/8/1/N0/17/24//185/122/65
112
       22/8/2/N0/17/24//185/302/65
113
       24/1/1/18.75/9.5//183/122
114
       24/1/2/10.75/9.5//183/212
115
       24/2/1/15/17.5//183/212
116
       24/3/1/10.75/9.5//183/212
```

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CONTENTS OF : E:\CB118.TM
LINE #
 117
       24/3/2/10.75/9.5//183/302
 118
       24/4/1/7.75/9.5//183/302
 119
       24/6/1/7/18//184/122
 120
       24/6/2/150/1//184/212
 121
       24/6/3/7/18//184/302
 122
       24/7/1/53.5/20//184/122
 123
       24/7/2/53.5/20//184/302
 124
       24/8/1/17.5/18//183/302
 125
       24/8/2/46/18//183/32
 126
       24/8/3/17.5/18//183/122
       25/1/1/3.5/2.5/2/.58/.57
 127
 128
       25/2/1/109/1/1/.65/.88
 129
       25/3/2/3.5/2.5/1/.58/.57
 130
       25/4/1/3.5/2.5/1/.58/.57
 131
       26/M/CBTHP/CBTHL/CBTHFAN//OFF/CBTHFAN/OFF/OFF/OFF/OFF
       27/1/2/PEOPLE/230/190/1.5/WATT-SF
132
133
       27/2////1.5/WATT-SF
134
       27/3////1.5/WATT-SF
135
       27/4////1.5/WATT-SF
136
       27/5////1.5/WATT-SF
137
       27/6////1.5/WATT-SF
       27/7/200/PEOPLE/210/140/0/WATT-SF
138
       29/1/////.21/CFM-SF
139
140
       29/2//////.21/CFM-SF
141
       29/3/////.21/CFM-SF
142
       29/4/////.21/CFM-SF
 143
       29/5//////.21/CFM-SF
144
       29/6/10/PCT-MCLG/10/PCT-MHTG/.21/CFM-SF/.21/CFM-SF
145
       29/7/10/PCT-MCLG/10/PCT-MHTG/.21/CFM-SF/.21/CFM-SF
146
       29/8//////.21/CFM-SF
147
       30/6/3.58/CFM-SF/3.58/CFM-SF
148
       30/7/3.58/CFM-SF/3.58/CFM-SF
149
       SYSTEM - 2
150
       39/2/WALL & ROOF INSULATION
151
       40/1/RAD
152
       41/1/1/1/3/3
153
       42/1
154
       44/1
155
       45/1/OFF/OFF/OFF/OFF/OFF/CBTHHTG/OFF/OFF/OFF/OFF
156
       40/2/SZ
157
       41/2/2/2
158
       42/2/.5
159
       44/2/DRY-BULB/65/100
160
       45/2/CBTHCLG/AVAIL/OFF/OFF/OFF/CBTHHTG/OFF/OFF/OFF/OFF
161
       EQUIPMENT - 2
162
       59/2/CARLISLE///WALL & ROOF INSULATION
163
       60/1/1/BLKPLANT/2/2
164
       62/1/EQ1170L/1
165
       65/1/1//1/2
166
       67/1/EQ2102/1
167
       69/1
168
       69/2/EQ4003
```

Building 118

Trace Output File

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 118

Weather File Code: CARLISLE

Location: ENERGY SAVINGS OPPORTUNITY STUDY

 Latitude:
 40.2 (deg)

 Longitude:
 77.2 (deg)

 Time Zone:
 5

Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: July To July
System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 9:45:24 1/25/94
Dataset Name: CB118 .TM

AIRFLOW - ALTERNATIVE 1 BASE BUILDING

> ------ SYSTEM SUMMARY --------(Design Airflow Quantities)

System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
1	RAD	0	0	0	0	661	0	0
2	SZ	1,030	10,301	10,301	11,039	10,301	. 0	0
Totals		1,030	10,301	10,301	11,039	10,962	0	0

CAPACITY - ALTERNATIVE 1 BASE BUILDING

(Design Capacity Quantities)

System Number	System Type	Main Sys. Capacity	Aux. Sys. Capacity	Opt. Vent Capacity		Main Sys. Capacity (8tuh)	Aux. Sys. Capacity (8tuh)	Preheat Capacity (Btuh)	Heating Reheat Capacity (Btuh)		Opt. Vent	Heating Totals (Btuh)
	RAD SZ	0.0 5.9 5.9		0.0 0.0 0.0	0.0 5.9 5.9	-121,401 180,542 -301,943	0 0 0	0 -177,011 -177,011	0 0	0 0	0 0 0	-121,401 -180,542 -301,943

The building peaked at hour 19 month 7 with a capacity of 5.9 tons

NGINEERING CHECKS-----

ENGINEERING CHECKS - ALTERNATIVE 1

BASE BUILDING

			Percent		Cool:	ing		Heat	ing	-
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	8tuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-84.54	1,436
	Main	S Z	10.00	3.69	1,733.6	469.5	25.56	<b>3.6</b> 9	-64.71	2,790

System 1 Block RAD - RADIATION

			OOLING COIL		********	******				***** HEA			******
	t Time ==:		Mo/Hr:	•				/Hr: (	•		Mo/Hr: 1	•	
Outside	Air ==>	DA	DB/WB/HR:	0/ 0/ 0.	0		* 0	ADB:	0 *		OADB:	4	
		Space	Ret. Air	Ret. Air	Not	Percnt	* *	pace	Noront *	Chana Na	ak Coil	Dool	Na
	S	ns:+Lat.	Sensible	Latent	Total			•	Percnt * Of Tot *	,			Percnt
Envelope		(Btuh)	(Btuh)	(Btuh)	(Btuh)			tuh)	(%) *				Of Tot
Skylite		(00011)	(0:011)	(neall)	(0:011)		-	0 -	0.00 *		0	tuh)	(\$)
Skylite		0	0		0			0	0.00 *		^	0	0.00
Roof Co		0	0		0			٥	0.00 *		۷ _10	77E	0.00
Glass		0	0		0			.0	0.00 *		Λ -1 <del>3</del>	,375 0	15.96 0.00
Glass		0	0		0			0	0.00 *		V 24 _E	,984	4.93
Wall Co		0	0		. 0			0	0.00 *	•		-	
Partit		0	V		0			0	0.00 *	•	0 -30	,019	41.20
	d Floor	0			0			0	0.00 *		-	0	0.00
Infilt		0			0			0	0.00 *		0	0	0.00
Sub To		0	0		0			0				,022	37.91
Internal		V	V		V	0.00	*	U	0.00 *	-94,3	38 -121	,401	100.00
Lights	Ludus	0	0		0	0.00	•	0			۸	۸	۸ ۸۸
People		0	V		0			0	0.00 * 0.00 *		0	0	0.00
Misc		0	0	0	0			0	0.00 *			۷	0.00
Sub Tot	tal\	0	0	0	0			0	0.00 *		0	0	0.00
Ceiling (		0	0	V	0			0		-27 0	•	٧	0.00
Outside A		0	0	0	0			0	0.00 * 0.00 *	-26,8		۷	0.00
Sup. Fan		V	V	V	0			v	0.00 *		0	۷ ^	0.00
Ret. Fan			0		. 0				0.00 *			۷	0.00
Duct Heat			0		. 0				0.00 *			0	0.00
OV/UNDR S		0	- '		0			0	0.00 *		0	۷	0.00
Exhaust H	-	V	0	0	0			V	0.00 *		V	٥	0.00
Terminal			0		0				0.00 *			٥	0.00 0.00
101111111111111111111111111111111111111	uy pass		V,	v	v	0.00	*		*			V	0.00
Grand Tot	tal==>	0	0	0	0	0.00	*	0	0.00 *	-121,19	77 -121	,401	100.00
			cnn	ING COIL S	FLECTION						AREAS-		
	Total C	apacity	Sens Cap.			ng DB/WB/I	HR leav	vina DA	/WB/HR	Gross Tota		ss (sf	) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)		g F Grai		-	Grains	Floor	1,436	,, (5,	) (*)
Main Clg	0.0	0.0	0.0	` 0	_	-	.0 0.0	0.0	0.0	Part	0		
Aux Clg	0.0	0.0	0.0	0			.0 0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0			.0 0.0	0.0	0.0	Roof	1,551		0 0
Totals	0.0	0.0	:   							Wall	2,279	1	44 6
	HEATING	COIL SEL	ECTION		AI	RFLOWS (c	fm)	E	NGINEERING	CHECKS	TEMPER	ATURES	(F)
į	Capacity	Coil A	irfl Ent	Lvg	Type	Cooling	Heating		% 0A	0.0	Туре	Clg	Htg
	(Mbh)	(cfi	n) Deg F		Vent	Õ	0	-	Cfm/Sqft	0.00	SADB	0.0	
Main Htg	-121.4	ļ	0 0.0	0.0	Infil	0	661		Cfm/Ton	0.00	Plenum	0.0	
Aux Htg	0.0	1	0 0.0	0.0	Supply	0	0		Sqft/Ton	0.00	Return	0.0	
Preheat	0.0	1	0 0.0	0.0	Mincfm	0	0	_	Btuh/Sqft		Ret/OA	0.0	
	0.0	;	0 0.0	0.0	Return	0	0	_	People	0	Runarnd	0.0	
Reheat													
Reheat Humidif	0.0	)	0 0.0	0.0	Exhaust	0	0	Hto	% 0A	0.0	Fn MtrTD	0.0	0.0
	0.0 0.0		0 0.0		Exhaust Rm Exh	0	0	_	% OA Cfm/SqFt	0.0 0.00	Fn MtrTD Fn BldTD		

Peaked at Time ==> Mo/Hr: 7/19 Mo/Hr: 7/19 \* Mo/Hr: 13/1 Outside Air ==> OADB/WB/HR: 85/ 70/ 91.0 \* OAD8: 85 OADB: 4 Space Percnt \* Space Peak Coil Peak Percnt Ret. Air Ret. Air Net Percnt \* Space Sensible Of Tot \* Space Sens Sens.+Lat. Sensible Latent Total Of Tot \* Tot Sens Of Tot (Btuh) (Btuh) (Btuh) Envelope Loads (Btuh) (Btuh) (%) \* (%) \* (8tuh) (Btuh) (\$) 0 0 0 0 0 39,494 Skylite Solr 0 0 0.00 \* 0 -0.00 \* 0 0 0.00 0 0.00 Skylite Cond 0 0.00 \* 0 0.00 \* 0 39,494 55.39 \* 0 -67,000 37.35 Roof Cond 0.00 \* 0 0 0 0 0.00 \* Glass Solar -0 0.00 \* 0 0.00 0 0.00 0 Glass Cond 0 0.00 \* 0 0.00 \* 16,350 3,459 19,810 27.78 \* Wall Cond 16,350 52.41 \* -44,736 . -54,771 30.53 0 0 0.00 0 0.00 Partition 0 0.00 \* 0.00 \* Exposed Floor 0 0 0.00 \* 0 0.00 \* 4,447 20,797 42,954 4.447 6.24 \* 7,862 25.20 \* -51,341 -51,341 28.62 Infiltration 7,862 25.20 \* 24,212 77.61 \* -96,077 -173,113 96.51 63,751 89.40 \* Sub Total:=> Internal Loads 152 \* 152 0 Lights 152 0.21 \* 0.49 \* 0 0 0.00 420 0 People 0 420 0.59 \* 420 1.35 \* 0 0 0.00 0 0 0.00 \* 0.00 \* Misc 0 0 0 0 0.00 572 0 0 572 0.80 \*
5,430 -5,430 0 0.00 \*
0 0 6,214 8.71 \* 0 Sub Total:=> 572 1.83 \* 0 5,464 17.51 \* -9,558 0 0.00 \* 0 572 1.83 \* Ceiling Load 0 0.00 Outside Air 0 0.00 3,663 Sup. Fan Heat 5.14 \* 0.00 \* 0 0.00 Ret. Fan Heat 0 0 0.00 \* 0.00 \* 0.00 Duct Heat Pkup 949 -3.841 0. 0 0.00 \* 0.00 \* 0 0.00 949 -6,269 -6,269 OV/UNDR Sizing 1.33 \* 949 3.04 \* 3.49 3,841 0 -3,841 -5.39 \* 0 0 0.00 \* \* 0.00 \* Exhaust Heat 0 0.00 Terminal Bypass 0.00 \* 0.00 Grand Total==> 27,748 33,682 0 71,307 100.00 \* 31,196 100.00 \* -111,904 -179,382 100.00 Total Capacity Sens Cap. 'Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 2,790 10,301 79.5 Main Clg 5.9 71.3 79.1 69.7 97.1 71.9 67.8 98.4 0 Part 0.0 0.0 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 Aux Clg ExFlr . 0 0.0 Opt Vent 0.0 0.0 0 0.0 0.0 0.0 0.0 Roof 0.0 0.0 2,918 71.3 5.9 Totals Wall 2,542 -----HEATING COIL SELECTION----------AIRFLOWS (cfm)------ -- ENGINEERING CHECKS-- -- TEMPERATURES (F)---Capacity Coil Airfl Ent | Lvg Type Cooling Heating Clg % OA 10.0 Type Clg Htg (cfm) Deg F<sup>|</sup> Deg F (Mbh) O Clg Cfm/Sqft 72.2 78.0 Vent 1.030 3.69 SADB -180.5 10,301 61.9 Main Htq 78.0 Infil 737 737 Clg Cfm/Ton 1733.59 Plenum 78.4 61.9 0 0.0 0.0 Supply 10,301 10,301 0.0 Aux Htg Clg Sqft/Ton 469.52 Return 78.4 61.9 0 Preheat **-177.0** 10,301 56.1 71.9 Mincfm 0 Clg Btuh/Sqft 25.56 Ret/OA 79.1 61.9 10,301 10,301 No. People 200 0.0 0 0.0 0.0 Reheat Return Runarnd 75.0 68.0 Humidif 0.0 0 0.0 0.0 Exhaust 1,030 0 Htg % OA 0.0 Fn MtrTD 0.1 0.0 0.0 0.0 Rm Exh O Htg Cfm/SqFt 3.69 Fn BldTD Opt Vent 0 0.1 0.0 0 -180.5 Auxil O Htg Btuh/SqFt -64.71 Fn Frict 0.2 Total 0.0 BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

----- BUILDING U-VALUES -----

						m U-Val ı/hr/sqf					Room Mass	Room Capac.
Room				Summr	₩intr		Summr	Wintr		•	(1b/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	MANAGERS OFFICE	0.000	0.000	0.000	0.000	0.397	0.580	0.594	0.425	0.568	183.0	43.33
2	LOBBY	0.000	0.000	0.000	0.000	0.397	0.650	0.668	0.425	0.568	106.9	26.72
3	LOUNGE	0.000	0.000	0.000	0.000	0.397	0.580	0.594	0.425	0.568	235.2	54.80
4	MENS TOILET	0.000	0.000	0.000	0.000	0.397	0.580	0.594	0.425	0.568	228.3	53.27
5	WOMENS TOILET	0.000	0.000	0.000	0.000	0.397	0.000	0.000	0.000	0.568	12.1	5.70
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.397	0.633	0.650	0.425	0.568	157.4	37.74
8	STAGE	0.000	0.000	0.000	0.000	0.397	0.000	0.000	0.425	0.568	240.4	55.86
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.397	0.000	0.000	0.425	0.568	240.4	55.86
System	<ol> <li>Total/Ave.</li> </ol>	0.000	0.000	0.000	0.000	0.397	0.633	0.650	0.425	0.568	205.3	48.19
6	FOYER & HALLWAYS	0.000	0.000	0.000	0.000	0.397	0.000	0.000	0.343	0.568	174.0	41.23
7	AUDITORIUM	0.000	0.000	0.000	0.000	0.397	0.000	0.000	0.343	0.568	127.1	30.93
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.397	0.000	0.000	0.343	0.568	132.7	32.14
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.397	0.000	0.000	0.343	0.568	132.7	32.14
Buildin	g	0.000	0.000	0.000	0.000	0.397	0.633	0.650	0.381	0.568	157.3	37.59

BUILDING AREAS - ALTERNATIVE 1 BASE BUILDING

BUTIDING ARFAS

Room Number	Description		er of icate Rm	Floor Arpa/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	MANAGERS OFFICE	1	1	200	200	0	0	0	0	225	18	6	263
2	LOBBY	1	1	214	214	0	0	0	0	294	109	42	153
3	LOUNGE	1	1	1114	114	0	0	0	0	128	9	4	195
4	MENS TOILET	1	1	39	39	0	0	0	0	43	9	12	65
5	WOMENS TOILET	1	1	41	41	0	0	0	0	45	0	0	0
Zone	1 Total/Ave.			:	608	0	0	0	0	735	144	18	677
8	STAGE	1	1	828	828	0	0	0	0	816	0	0	1,458
Zone	3 Total/Ave.				828	0	0	0	0	816	0	0	1,458
System	1 Total/Ave.			1	1,436	0	0	0	0	1,551	144	6	2,135
6	FOYER & HALLWAYS	1	1	329	329	0	0	0	0	350	0	0	402
7	AUDITORIUM	1	1	2,461	2,461	0	0	0	0	2,568	0	0	2,140
Zone	2 Total/Ave.				2,790	0	0	0	0	2,918	0	0	2,542
System	2 Total/Ave.			i.	2,790	0	0	0	0	2,918	0	0	2,542
Buildin	g				4,226	0	0	0	0	4,469	144	3	4,677

Trane Air Conditioning Economics By: Trane Customer Direct Service Network

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ASHRAE 90 ANALYSIS - ALTERNATIVE 1 BASE BUILDING

----- A S H R A E 90 A N A L Y S I S -----

Overall Roof U-Value = 0.397 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.388 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.392 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) =  $35.60 \, (Btu/Hr/Sq \, Ft)$  Wall Overall Thermal Transfer Value (OTTVw) =  $5.59 \, (Btu/Hr/Sq \, Ft)$ 

Trane Air Conditioning Economics

By: Trane Customer Direct Service Network

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

## System Totals

Percent	Cool	ing Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.3	0	0	-23,948	0	0	515.1	0	0	0.0	0	0
5 - 10	0.6	0	0	-47,895	. 0	18	1,030.1	0	0	0.0	. 0	0
10 - 15	0.9	0	0	-71,843	0	3	1,545.2	. 0	0	0.0	0	0
15 - 20	1.2	7	10	-95,791	0	14	2,060.3	0	0	0.0	0	0
20 - 25	1.5	3	5	-119,739	3	98	2,575.4	0	0	0.0	0	0
25 - 30	1.8	0	0	-143,686	3	111	3,090.4	0	0	0.0	0	0
30 - 35	2.1	0	0	-167,634	9	347	3,605.5	0	0	0.0	0	0
35 - 40	2.4	0	0	-191,582	15	532	4,120.6	0	0	0.0	0	0
40 - 45	2.7	0	0	-215,529	31	1,131	4,635.6	0	0	0.0	0	0
45 - 50	3.0	0	0	-239,477	14	516	5,150.7	71	6,205	0.0	0	0
<b>50 -</b> 55	3.3	0	0	-263,425	10	351	5,665.8	0	0	0.0	0	0
55 - 60	3.6	0	0	-287,373	7	255	6,180.8	0	0	0.0	0	0
60 - 65	3.9	0	0	-311,320	8	290	6,695.9	0	0	0.0	0	0
65 - 70	4.2	0	0	-335,268	0	0	7,211.0	0	0	0.0	0	0
70 - 75	4.5	0	0	-359,216	0 -	. 0	7,726.1	0	0	0.0	0	0
75 - 80	4.8	0	0	-383,163	0	0	8,241.1	0	0	0.0	0	0
80 - 85	5.1	0	0 -	-407,111	0	0	8,756.2	0	0	0.0	0	0
85 - 90	5.3	0	0	-431,059	0	0	9,271.3	0	0	0.0	0	0
90 - 95	5.6	0	0	-455,006	0	0	9,786.3	0	0	0.0	0	0
95 - 100	5.9	90	135	-478,954	0	0	10,301.4	29	2,555	0.0	0	0
Hours Off	0.0	0	8,610	0	0	5,094	0.0	0	0	0.0	0	8.760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
BASE BUILDING

-- BUILDING TEMPERATURE PROFILES------

..... Number of Hours .......

----- Zone Number -----

Temperature آ سر Range 2 (F) Max. Temp. 97.7 95.0 87.7 Mo./Hr. 8 21 4 23 7 17 Day Type 1 2 Above 100 95 - 100 646 0 0 90 - 95 3,221 486 0 85 - 90 1,739 2,133 333 80 - 85 944 2,083 1,445 75 - 80 696 1,638 1,514 70 - 75 674 1,054 1,882 65 - 70 728 2,087 421 60 - 65 198 336 910 55 - 60 180 209 353 50 - 55 41 93 179 Below 50 0 57 Min. Temp. 53.6 51.5 48.3 Mo./Hr. 2 24 2 24 2 24 Day Type

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MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING

------ MONTHLY ENERGY CONSUMPTION -----

	ELEC	DEMAND	HOT WTR	HOT W DMND
	_Off Peak	On Peak	On Peak	On Peak
Month	(kWh)	(k₩)	(Therm)	(Thrm/hr)
Jan	1,167	4	1,325	3
Feb	1,055	4	1,200	3
March	1,168	4	1,179	3
April	1,129	4	804	2
May	1,184	9	0	. 0
June	1,373	9	0	- 0
July	1,506	9	0	0
Aug	1,408	9	0	0
Sept	1,124	9	0	0
Oct	1,168	4	895	2
Nov	1,130	4	1,008	3
Dec	1,168	4 ·	1,266	3
Total	14,581	9	7,677	3

Building Energy Consumption = 193,447 (Btu/Sq Ft/Year) Floor Area = 4,226 (Sq Ft)
Source Energy Consumption = 277,559 (Btu/Sq Ft/Year)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

1 EQ5020

HEAT WATER CIRC. PUMP C.V.

----- EQUIPMENT ENERGY CONSUMPTION ------

	Equip	7	P_1		A .				-	_				
JM	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS													
	ELEC	102	93	103	99	103	100	102	103	99	103	99	102	1,207
	PK	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
1	MISC LD						•							
	ELEC	0	0	0	0	0	0	. 0	0	. 0	0	0	0	(
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	1
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	ı
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
4	MISC LD													
	P STEAM	0	0	Ũ	0	0 .		0	0	0	0	0	0	
	ÞK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
5	MISC LD													
	P HOTH20	0	0	Ō	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
6	MISC LD			L					-					
	P CHILL	0	0	0	0	0	0	0	0		0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
1	EQ1170L	٨			COMP >2									
	ELEC	0	0	0	0	16	208	289	206	0	0	0	0	72
	PK	0.0	0.0	0.0	0.0	5.2	5.5	5.7	5.5	5.2	0.0	0.0	0.0	5.
1	EQ5200		COND	ENSER FA	NS									
	ELEC	0	0	0	0	2	28	39	28	0	0	0	0	9
	PK	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.
1	EQ5313		CONT	ROLS										
	ELEC	0	0	Ó	0	5		16	12	0	0	0	0	4
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.
2	EQ4003				FAN C.V.									
	ELEC	1059	957	1059	1025	1059	1025	1059	1059	1025	1059	1025	1059	12,47
	PK	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.
1	EQ2102				ST. HOT									.'
	P HOTH20	1325		1179	804	0	0	0	0	0	895	1008	1266	7,6
	PK	3.0	3.0	2.5	2.1	0.0	0.0	0.0	0.0	0.0	2.0	2.6	3.0	3

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING

6 5 5 ELEC 6 40 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 PK

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1

**Grand Total** 

BASE BUILDIN				
		UTILITY PEA	K CHEC	KSUM
Utility EL	ECTRIC DEMAND			
Peak Value Yearly Time	9.0 (kW) of Peak 18 (hr) 7	(mo)		•
Hour 18 Mon	th 7			
Eqp. Ref. E Num. C	quipment ode Name	Equipment Description	Utility Demand (kW)	Of Tot
Cooling Equi	pment		·	
1	EQ1170L AIR-CLD CO	OND COMP >20 TOMS	6.7	74.06
Sub Total			6.7	74.06
Sub Total			0.0	0.00
Air Moving E	quipment			
2	SUMMATION	OF FAN ELECTRICAL DEMAND	2.2	24.38
Sub Total			2.2	24.38
Sub Total			0.0	0.00
Miscellaneou	S			
Lights Base Utilit Misc Equipm Sub Total			0.0	1.55 0.00 0.00 1.55

9.0 100.00

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Trane Air Conditioning Economics

By: Trane Customer Direct Service Network
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS. PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 118

Time/Date Program was Run:

Dataset Name:

Weather File Code: Location: Latitude: Longitude: Time Zone: Elevation: Barometric Pressure:	40.2 77.2 5 475	SAVINGS OPPORTUNITY STUDY (deg) (deg)
Summer Clearness Number:	1.00	
Winter Clearness Number:	1.00	
Summer Design Dry Bulb:	92	(F)
Summer Design Wat Bulb.	72	(F)
Winter Design Dry Bulb:	4	(F)
Summer Ground Relectance:	0.20	
Winter Ground Relectance:	0.20	
Air Density:	0.0742	(Lbm/cuft)
Air Specific Heat:	0.2444	(Btu/lbm/F)
Density-Specific Heat Prod:	1.0882	(Btu-min./hr/cuft/F)
Latent Heat Factor:	4,790.2	(Btu-min./hr/cuft)
Enthalpy Factor:	4.4519	(Lb-min./hr/cuft)
Design Simulation Period: July System Simulation Period: Janua Cooling Load Methodology:	ry To	December
annered have managered).	:	(

9:53:53 1/25/94

CB118 .TM

AIRFLOW - ALTERNATIVE 2 WALL & ROOF INSULATION

> ----- SYSTEM SUMMARY -----(Design Airflow Quantities)

System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Main Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
1	RAD	0	0	0	0	479	0	0
2	SZ	1,040	10,405	10,405	10,938	10,405	. 0	0
Totals		1,040	10,405	10,405	10,938	10,883	0	0

CAPACITY - ALTERNATIVE 2 WALL & ROOF INSULATION

-- SYSTEM SUMMARY -----

(Design Capacity Quantities)

System	System	Main Sys. Capacity	Aux. Sys.	Opt. Vent			Aux. Sys. Capacity	Preheat Capacity	Heating Reheat Capacity		Opt. Vent	Heating Totals
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(8tuh)	(Btuh)
1	RAD	0.0	0.0	0.0	0.0	-50,656	0	0	0	0	0	-50,656
2	SZ	1.7	0.0	0.0	1.7	-50,697	0	-146,077	0	0	0	-50,697
Totals		1.7	0.0	0.0	1.7	-101,352	0	-146,077	0	0	0	-101,352

The building peaked at hour 19 month 7 with a capacity of 1.7 tons

ENGINEERING CHECKS - ALTERNATIVE 2

WALL & ROOF INSULATION

NGINEERING CHECKS----

			Percent		Coo	ling		Heat			
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft	
	Main Main	RAD S Z	0.00 10.00	0.00 3.73	0.0 6,206.6	0.0 1,664.3	0.00 7.21	0.00	-35.28 -18.17	1,436 2,790	

System 1 Block RAD - RADIATION

Peaked at Time	::>	Mo/Hr: 0	/ 0			*	Mo	/Hr: 0	/ 0 *		Mo/Hr:	13/ 1		
Outside Air ==>	0.6	ADB/WB/HR:	0/ 0/ 0.	0		*		ADB:	0 *		OAD8:	•		
			<b>.</b>			*			*			•		
	Space		Ret. Air			rent *		pace	Percnt *	•		l Peak		rent
	Sens.+Lat.	Sensible	Latent	Tot		Tot *	•		Of Tot *	•		t Sens	Of	Tat
Envelope Loads	(Btuh)	(Btuh)	(Btuh)	(Btu		(%) *	•	tuh)	(%) *	•	ıh)	(Btuh)		(*
<b>Skyli</b> te Solr	0	0				0.00 *		0 -	0.00 *		0	0		0.0
Skylite Cond	0	0				0.00 *		0	0.00 *		0 -	0	(	0.0
Roof Cond	0	0			0	0.00 *		0	0.00 *		0	-3,658		7.2
Glass Solar	0	0			0	0.00 *		.0	0.00 *		0	0	(	0.0
Glass Cond	0	, 0			0	0.00 *		0	0.00 *	-5,9	84	-5,984	13	1.8
Wall Cond	0	0			0	0.00 *		0	0.00 *	-5,7	76 -	-7,687	1!	5.1
Partition	0				0	0.00 - *		0.	0.00 *		0	0	(	0.0
Exposed Floor	0				0	0.00 *		0	0.00 *		0	0		0.0
Infiltration	0				0	0.00 *		0	0.00 *		26 -	33,326		5.7
Sub Total==>	0	0				0.00 *		0	0.00 *			50,655		0.0
Internal Loads						*		•	*	,-,•	•	.,		•
Lights	0	0			0	0.00 *		0	0.00 *		0	0	1	0.0
People	0	1				0.00 *		0	0.00 *		0	0		0.0
Misc	0	0	0			0.00 *		0	0.00 *		0	Ō		0.0
Sub Total:=>	0	0	Ö			0.00 *		0	0.00 *		0	0		0.0
Ceiling Load	0	0	·			0.00 *		0	0.00 *	-5,5	•	0		0.0
Outside Air	0	0	0			0.00 *		0	0.00 *	3,3	0	Ŏ		0.0
Sup. Fan Heat	·	v	v			0.00 *		v	0.00 *		V	0		0.0
R <b>et.</b> Fan Heat		0				0.00 *			0.00 *			0		0.0
Duct Heat Phup		0				0.00 *			0.00 *			0		0.0 0.0
OV/UNDR Sizing	0	. •				0.00 *		0	0.00 *		0	0		0.0
Exhaust Heat	V	0	0			0.00 *		v	0.00 *		V	0		
Terminal Bypass		0	0			0.00 *			0.00 *			-		0.0
totainai typass		V	V		v	0.00 ≠ ≭			V.VU *			0	(	0.0
Grand Total==>	0	0	0		0	0.00 *		0	0.00 *	-50,6	50 -	50,655	100	0.0
************************************		ا LOOD	ING COIL S	ELECTION-							ARFA	S		
Total	l Capacity	Sens Cap.			ring D	B/WB/HR	Lea	ving DB	/W8/HR	Gross Tot		lass (s		(%)
· (Tons	) (Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	1,436			
ain Clg 0.0	0.0	0.0	0	0.0	0.0	0.0		0.0	0.0	Part	0			
ux Clg 0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0			
pt Vent 0.0	0.0	0.0	0	0.0	0.0	0.0		0.0	0.0	Roof	1,551		0	
otals 0.0	0.0	1								Wall	2,279			
HEAT	ING COIL SEL	ECTION					)	8	NGINEERING	CHECKS	TEMP	ERATURES	3 (F	)
: Capac	ity Coil A	Airfl Ent		Type			Heating		* 0A	0.0	Type			Ήtς
(Mbl	n) (ct	m) Deg F	Deg F	Vent		Ō	0	Clg	Cfm/Sqft	0.00	SADB	0.0		68.
ain Htg -50	).7	0.0	0.0	Infil		0	479	Clg	Cfm/Ton	0.00	Plenum			61.
	0.0	0 0.0	0.0	Supply		0	0		Sqft/Ton		Return			61.
ıx Htg (	0.0	0.0	0.0	Mincfm		0	0		Btuh/Sqft		Ret/OA			61.
	7.0					0	0		People	0				68.
eheat (	).0	0 0.0	0.0	Return		U	v	NO.	Leabte	V	Runarn	U V.	,	vu.
reheat (		0 0.0	0.0 0.0			0	0							
reheat ( cheat ( umidif (	0.0	,	0.0	Return Exhaust Rm Exh		=	-	Htg	reopie  % OA   Cfm/SqFt	0.0	Fn Mtr Fn Bld	TD 0.0	0	0.

System 2 Peak SZ - SINGLE ZONE

Peaked at Time ==> Mo/Hr: 7/19 \* Mo/Hr: 7/19 \* Mo/Hr: 13/ 1 Outside Air ==> OADB/WB/HR: 85/ 70/ 91.0 OAD8: 85 \* OADB: 4 Net Percnt \* Space Percnt \* Space Peak Coil Peak Percnt Space Ret. Air Ret. Air Sens.+Lat. Sensible Latent Total Of Tot \* Sensible Of Tot \* Space Sens Tot Sens Of Tot (Btuh) Envelope Loads (Btuh) (Btuh) (Btuh) (Btuh) (%) \* (%) \* (Btuh) (Btuh) (\$) Skylite Solr 0 0 0.00 \* 0 0 -0 0.00 \* 0 0.00 0 0.00 0 -7,603 15.06 0 0 0.00 0 0 0.00 Skylite Cond 0 0.00 \* 0 0.00 \* 7,347 36.52 \* Roof Cond 0 0.00 \* 0 0.00 \* 0 0.00 0 0.00 \* 0 0 0.00 1,245 14.09 \* -3,780 -4,708 9.32 Glass Solar 0 0.00 \* Glass Cond 0 0.00 \* 1,245 300 Wall Cond 1.544 7.68 \* 0 Partition 0 0.00 \* 0.00 \* 0 0 0.00 Exposed Floor 0 0 0.00 \* 0 0.00 \* 0 0 0.00 2,473 12.29 \* 5,693 64.43 \* -37,178 -37,178 73.63 11,365 56.50 \* 6,938 78.52 \* -40,958 -49,489 98.01 Infiltration 2,473
Sub Total==> 3,718 7,647 Internal Loads 152 0 420 : 0 0 0 0 Lights 152 1.72 \* 0 152 0 0.00 People 420 2.09 \* 420 4.75 \* 0 0 0.00 Misc 0 0.00 \* 0 0.00 \* 0 0 0.00 572 Sub Total==> 572 0 0 6.47 \* 0 572 2.84 \* Ceiling Load 0.00 0 973 11.01 \* -1,048 0 0.00 \* 0 971 -971 0 0.00 \* 0 0 0 4,821 23.96 \* 0 0.00 Outside Air 0 0.00 Sup. Fan Heat 3,699 18.39 \* 0.00 \* 0 0.00 0 0 Ret. Fan Heat . 0 0.00 \* 0.00 \* 0 0.00 0.00 \* 0 0.00 354 4.00 \* -1,007 -1,007 1.99 Duct Heat Pkup 0 0.00 \* OV/UNDR Sizing 354 1.76 \* -694 0 Exhaust Heat -694 -3.45 \* 0.00 \* 0 0.00 0 0.00 \* Terminal Bypass 0 0.00 \* 0 0.00 Grand Total==> 5,614 5,982 0 20,116 100.00 \* 8,836 100.00 \* -43,013 -50,496 100.00 Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 2,790 20.1 1.7 Main Clg 29.6 10,405 76.5 69.3 98.9 73.9 68.8 100.3 Part 0 Aux Clg 0.0 0.0 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 ExFlr 0 0.0 Opt Vent 0.0 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 Roof 2,918 Wall 2,542 Totals 1.7 20.1 -----AIRFLOWS (cfm)------ --ENGINEERING CHECKS----TEMPERATURES (F)---Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 10.0 Type Clg Htg (Mbh) (cfm) Deg F Deg F Vent 1,040 O Clg Cfm/Sqft 3.73 SAD8 74.2 71.8 Main Htq -50.7 10,405 67.3 71.8 Infil 534 534 Clg Cfm/Ton 6206.58 Plenum 75.6 67.3 0.0 0 0.0 0.0 Aux Hta Supply 10,405 10,405 Clg Sqft/Ton 1664.31 Return 75.6 67.3 10,405 61.0 73.9 Mincfm 0 0 Clg Btuh/Sqft 7.21 0 0.0 0.0 Return 10,405 10,405 No. People 200 -146.1 10,405 61.0 73.9 Mincfm Preheat Ret/OA 76.5 67.3 0.0 Reheat Runarnd 75.0 68.0 0.0 0.0 0.0 Exhaust 1,040 0 Htg % OA Humidif 0.0 Fn MtrTD 0.1 0.0 Htg Cfm/SqFt 3.73 Fn BldTD 0.1 Opt Vent 0.0 0 0.0 0.0 Rm Exh 0 0 0.0 Total -50.7 Auxil 0 O Htg Btuh/SqFt -18.17 Fn Frict 0.2

BUILDING U-VALUES - ALTERNATIVE 2 WALL & ROOF INSULATION

------ BUILDING U-VALUES-----

	Room U-Values(Btu/hr/sqft/F)											Room Capac.
Room				Summr	Wintr		Summr	Wintr		•	(lb/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	MANAGERS OFFICE	0.000	0.000	0.000	0.000	0.041	0.580	0.594	0.058	0.568	192.8	45.45
2	LOBBY	0.000	0.000	0.000	0.000	0.041	0.650	0.668	0.058	0.568	114.3	28.42
- 3	LOUNGE	0.000	0.000	0.000	0.000	0.041	0.580	0.594	0.058	0.568	246.9	57.33
4	MENS TOILET	0.000	0.000	0.000	0.000	0.041	0.580	0.594	0.058	0.568	239.7	55.72
5	WOMENS TOILET	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.000	0.568	15.1	6.48
Zone	<pre>1 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	0.633	0.650	0.058	0.568	166.3	39.72
8	STAGE	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.058	0.568	252.0	58.33
Zone	<pre>3 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.058	0.568	252.0	58.33
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.633	0.650	0.058	0.568	215.7	50.45
: 6	FOYER & HALLWAYS	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.029	0.568	65.6	16.54
7	AUDITORIUM	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.029	0.568	50.8	13.57
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.029	0.568	52.5	13.92
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.029	0.568	52.5	13.92
Buildin	g	0.000	0.000	0.000	0.000	0.041	0.633	0.650	0.042	0.568	108.0	26.33

BUILDING AREAS - ALTERNATIVE 2 WALL & ROOF INSULATION

BUTIDING ARFAS

Room		Oupl	er of icate	Area/	Room	Total Floor Area	Partition Area	Exposed Floor Area	Skylight Area	Skl /Rf	Net Roof Area	Window Area	Win /Wl	Net Wall Area
Number	Description	Flr	Rm	( S	qft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	MANAGERS OFFICE	1	1		200	200	0	0	0	0	225	18	6	263
2	LOBBY	1	1		214	214	0	0	0	0	294	109	42	153
3	LOUNGE	1	1	1	114	114	0	0	0	0	128	9	4	195
4	MENS TOILET	1	1	;	39	39	0	0	0	0	43	9	12	65
. 5	WOMENS TOILET	1	1	1	41	41	0	0	0	0	45	0	0	0
Zòne	1 Total/Ave.			;		608	0	0	0	0	735	144	18	6 <b>7</b> 7
8	STAGE	1	1		828	828	0	0	0	0	816	0	0	1,458
Zone	3 Total/Ave.			,		828	0	0	0	0	816	0	0	1,458
System	<pre>1 Total/Ave.</pre>					1,436	0	0	0	0	1,551	144	6	2,135
6	FOYER & HALLWAYS	1	1		329	329	0	0	0	0	350	0	0	402
7	AUDITORIUM	1	1	2	461	2,461	0	0	0	0	2,568	0	0	2,140
Zone	2 Total/Ave.					2,790	0	0	0	0	2,918	0	0	2,542
System	2 Total/Ave.			1		2,790	0	0	0	0	2,918	0	0	2,542
Buildin	g					4,226	0	0	0	0	4,469	144	3	4,677

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ASHRAE 90 ANALYSIS - ALTERNATIVE 2 WALL & ROOF INSULATION

----- A S H R A E 90 A N A L Y S I S ------

Overall Roof U-Value = 0.041 (Btu/Hr/Sq Ft/F) Overall Wall U-Value = 0.060 (Btu/Hr/Sq Ft/F) Overall Building U-Value = 0.051 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 2.27 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 4.03 (Btu/Hr/Sq Ft) SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 WALL & ROOF INSULATION

## System Totals \_ -

Percent	Cool	ling Loa	d	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
- <b>De</b> sign	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	- Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.1	Ú	0	-12,371	0	5	520.2	. 0	. 0	0.0	0	0
5 - 10	0.2	0	0	-24,743	. 0	11	1,040.5	0	0	0.0	. 0	0
10 - 15	0.3	0	0	-37,114	0	11	1,560.7	. 0	0	0.0	0	0
15 - 20	0.3	0	0	-49,486	8	282	2,080.9	0	0	0.0	0	0
20 - 25	0.4	0	0	-61,857	13	461	2,601.1	0	0	0.0	0	0
25 - 30	0.5	. 0	0	-74,229	15	538	3,121.4	0	0	0.0	0	0
30 - 35	0.6	0	0	-86,600	17	620	3,641.6	0	0	0.0	0	0
35 - 40	0.7	0	0	-98,972	13	473	4,161.8	0	0	0.0	0	0
40 - 45	0.8	0	0	-111,343	34	1,258	4,682.0	0	0	0.0	0	0
45 - 50	0.8	0	0	-123,715	0	0	5,202.3	71	6,205	0.0	0	0
50 - 55	0.9	0	0	-136,086	0	0	5,722.5	0	0	0.0	0	0
55 - 60	1.0	3	5	-148,458	0	0	6,242.7	0	0	0.0	0	0
60 - 65	1.1	0	0	-160,829	0	0	6,763.0	0	0	0.0	0	0
65 - 70	1.2	0	0	-173,200	0	0	7,283.2	0	0	0.0	0	0
70 - 75	1.3	0	0	-185,572	0 -	0	7,803.4	0	0	0.0	0	0
75 - 80	1.3	0	0	-197,943	0	0	8,323.6	0	0	0.0	0	0
80 - 85	1.4	0	0 -	-210,315	0	0	8,843.9	0	0	0.0	0	0
85 - 90	1.5	3	5	-222,686	0	0	9,364.1	0	0	0.0	0	0
90 - 95	1.6	0	0	-235,058	0	0	9,884.3	0	0	0.0	0	Ō
95 - 100	1.7	94	150	-247,429	0	0	10,404.5	29	2,555	0.0	Ö	Ō
Hours Off	0.0	0	8,600	0	0	5,101	0.0	0	0	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 WALL & ROOF INSULATION

-----BUILDING TEMPERATURE PROFILES--Temperature J. 1 Range (F) Max. Temp. 106.0 89.0 86.1 Mo./Hr. 9 20 11 24 7 24 Day Type 1 ..... Number of Hours ...... Above 100 2,208 0 0 95 - 100 1,406 90 - 95 1,531 0 0 85 - 90 1,102 383 76 80 - 85 815 4,757 1,212 828 1,111 1,582 75 - 80 70 - 75 511 1,115 1,613 65 - 70 342 1,128 2,513 60 - 65 17 266 1,041 55 - 60 0 506 0 50 - 55 217 0 Below 50 0 Min. Temp. 64.3 61.0 50.1 Mo./Hr. 1 11 2 24 2 18 Day Type 1 4

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

------ MONTHLY ENERGY CONSUMPTION------

	ELEC	DEMAND		HOT W DMND
	_Off Peak	On Peak	On Peak	On Peak
Month	(kWh)	(kW)	(Therm)	(Thrm/hr)
Jan	1,175	4	518	1
Feb	1,062	4	478	1
March	1,176	4	509	1
April	1,137	4	331	1
May	1,190	4	0	0
June	1,213	4	0	- 0
July	1,281	4	0	0
Aug	1,251	4	0	0
Sept	1,159	4	0	0
0ct	1,176	4	287	1
Nov	1,137	4	360	1
Dec	1,175	4	485	1
Total	14,133	4	2,968	1

Building Energy Consumption = 81,647 (Btu/Sq Ft/Year) Source Energy Consumption = 127,890 (Btu/Sq Ft/Year) Floor Area = 4,226 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 WALL & ROOF INSULATION

------EQUIPMENT ENERGY CONSUMPTION

				•										
	Equip Code	Jan	 Feb	 Mar	Apr	Mont May	thly Cons June	umption July	Aug	Sep	Oct	Nov	Dec	Total
		• • • • • • • • • • • • • • • • • • • •	, 00	1101	1161	1143	Vano	July	nug	Jep	UCL	1104	000	iviai
0	LIGHTS	100	0.7	102	20			4.00						i <sub>a</sub>
	ELEC PK	102 1.4	93	103	99	103	100	102	103	99	103	99	102	1,207
	71	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
1	MISC LD						-							
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	. 0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD			ı										<i>2</i>
•	OIL	0	0	.0	0	0	0	0	0	0	0	0	0	0
	РK	0.0	0.0	0,0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD			:										
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0 . 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH20	ð	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD			1					•	•				
	P CHILL	0	0	0	0	0	0	0.	.0 0.0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>0</b> .0	0.0	0.0	0.0	0.0	0.0
1	EQ1170L		AIR-	CLD COND	COMP >2	o tons								
_	ELEC	0	0	0	0	13	59	82	58	. 18	0	0	0	230
	PK	0.0	0.0	0.0	0.0	1.4	1.5	1.6		1.5	0.0	0.0	0.0	1.6
i	EQ5200		COND	 Enser fa	NS							•		
	ELEC	0	0	0	0	1	8	11	8	2	0	0	0	- 30
	PK	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.2
1	EQ5313		CONT	ROLS										
	ELEC	0	0	.0	0	3	12	16		5	0	0	0	48
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ4003		FC C	ENTRIF.	FAN C.V.									
	ELEC	1070	966	1070	1035	1070	1035	1070	1070	1035	1070	1035	1070	12,597
	PK	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
1	EQ2102		PURC	HASED DI	ST. HOT	WATER								. •
	P HOTH20	518	478	509	331	0	0	0	0	0	287	360	485	2,968
	PK	1.0	1.0	1.0	0.8	0.0	0.0	0.0	0.0	0.0	0.7	0.9	1.0	1.0
1	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.					e t		* ·	

Trane Air Conditioning Economics

By: Trane Customer Direct Service Network

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**EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2** WALL & ROOF INSULATION

ELEC

3 0.0 3 0.0 3 0.0 3 3 0.0 0.0 PΚ 0.0 0.0 0.0 0.0 0.0 0.0

21 0.0 UTILITY PEAK CHECKSUMS - ALTERNATIVE 2 WALL & ROOF INSULATION

**Grand Total** 

	UTILITY PEAK	CHEC	KSUM
Utility ELECTRIC D	EMAND		
Peak Value 4. Yearly Time of Peak			
Hour 18 Month 7			
Eqp. Ref. Equipment Num. Code Name		Utility Demand (kW)	Percnt Of Tot (%)
Cooling Equipment			
1 EQ1170L	AIR-CLD COND COMP >20 TONS	2.1	47.07
Sub Total	I	2.1	47.07
Sub Total	İ	0.0	0.00
Air Moving Equipment	4 4		
2	SUMMATION OF FAN ELECTRICAL DEMAND	2.2	49.79
Sub Total		2.2	49.79
Sub Total	)	0.0	0.00
Miscellaneous			
Lights Base Utilities Misc Equipment Sub Total		0.1 0.0 0.0 0.1	3.14 0.00 0.00 3.14

4.5 100.00

Building 122
Trace Input File

```
CONTENTS OF : C:\JOBS\CB122.TM
LINE #
  1
       JOB - 1
       01/ENERGY SAVINGS OPPORTUNITY STUDY
  2
       01/CARLISLE BARRACKS, PA
       01/DEPARTMENT OF THE ARMY
  5
       01/BENATEC ASSOCIATES
  6
       01/BUILDING 122
  7
       08/CARLISLE
  8
       09/MAY/SEP////APR/OCT
  9
       10/CLTD-CLF
 10
      11///ZONE
 11
      LOAD - 1
 12
      19/1/BASE BUILDING
 13
      20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10
 14
      20/2/2/TOILETS, KITCHEN/1/3520/4/2//11
 15
      20/3/3/STAIRS/1/560/4/0//11
 16
      20/4/4/BSMT E/1/12424/4/3.3//12.7
 17
      20/5/5/1ST FL OFFICES/1/11724/4/1.3//12
      20/6/6/1ST FL CEN DFFCS/1/9884/4/1.3//12
 19
      20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7
 20
      20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7
 21
      20/9/9/3RD FL OFFICES/1/14400/4/1.3//11
 22
      20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11
 23
      20/11/11/TOILETS W ROOF/1/580/4/2//11
 24
      20/12/12/STAIRS W ROOF/1/280/4/0//11
 25
      20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7
 26
      20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12
 27
      20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7
 28
      20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11
 29
      21/M///CBADCTX///CBADHTX
 30
      22/9/1/YES////14
 31
      22/10/1/YES////14
 32
      22/11/1/YES////14
 33
      22/12/1/YES////14
 34
      22/16/1/YES////14
35
      24/2/1/9/10.3//134/45
 36
      24/2/2/10/10.3//134/315
37
      24/3/1/16/11//135/45
38
      24/3/2/48/11//135/135
39
      24/3/3/16/11//135/225
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41
      24/5/2/281/11.3//134/135
42
     24/5/3/93/11.3//134/225
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     24/5/4/235/11.3//134/315
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     24/6/1/9/11.3//134/45
45
     24/6/2/27/11.3//134/135
     24/6/3/22/11.3//134/225
46
47
     24/6/4/56/11.3//134/315
48
     24/7/1/135/10//134/45
49
     24/7/2/320/10//134/135
50
     24/7/3/135/10//134/225
51
     24/7/4/344/10//134/315
52
     24/8/1/8/10//134/135
53
     24/8/2/8/10//134/315
54
     24/9/1/135/10.3//134/45
55
     24/9/2/320/10.3//134/135
56
     24/9/3/135/10.3//134/225
57
     24/9/4/344/10.3//134/315
```

58

24/10/1/8/10.3//134/135

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CONTENTS OF : C:\JOBS\CB122.TM
LINE #
  59
       24/10/2/8/10.3//134/315
  60
       24/12/1/8/10.3//135/45
  61
       24/12/2/24/10.3//135/135
  62
       24/12/3/8/10.3//135/225
  63
       24/14/1/9/11.3//134/45
  64
       24/14/2/27/11.3//134/135
  65
       24/14/3/22/11.3//134/225
  66
       24/14/4/56/11.3//134/315
  67
       24/15/1/8/10//134/135
  68
       24/15/2/8/10//134/315
  69
       24/16/1/8/10.3//134/135
  70
       24/16/2/8/10.3//134/315
  71
       25/2/1/8.5/2.5/1/.81/.64
  72
       25/3/1/8.5/2.5/6/.81/.64
  73
       25/3/3/8.5/2.5/6/.81/.64
 74
       25/5/1/8.5/2.5/5/.81/.64
 75
       25/5/2/8.5/2.5/35/.81/.64
  76
       25/5/3/8.5/2.5/6/.81/.64
  77
       25/5/4/8.5/2.5/28/.81/.64
  78
       25/6/1/8.5/2.5/5/.81/.64
 79
       25/6/2/8.5/2.5/7/.81/.64
 80
       25/7/1/7/2.5/6/.81/.64
 81
       25/7/2/7/2.5/40/.81/.64
 82
       25/7/3/7/2.5/6/.81/.64
 83
      25/7/4/7/2.5/40/.81/.64
 84
       25/8/1/7/2.5/3/.81/.64
 85
      25/8/2/7/2.5/3/.81/.64
 86
      25/9/1/7/2.5/6/.81/.64
 87
      25/9/2/7/2.5/40/.81/.34
 88
      .25/9/3/7/2.5/6/.81/.64
 89
      25/9/4/7/2.5/40/.81/.64
 90
      25/10/1/7/2.5/3/.81/.64
 91
      25/10/2/7/2.5/3/.81/.64
 92
      25/12/1/7/2.5/3/.81/.64
 93
      25/12/3/7/2.5/3/.81/.64
 94
      25/14/1/8.5/2.5/5/.81/.64
 95
      25/14/2/8.5/2.5/7/.81/.64
 96
      25/15/1/7/2.5/3/.81/.64
 97
      25/15/2/7/2.5/3/.81/.64
 98
      25/16/1/7/2.5/3/.81/.64
 99
      25/16/2/7/2.5/3/.81/.64
100
      26/1/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF
101
      26/2/C8ADP&L/CBADF&L/OFF/AVAIL/CBADFAN/OFF/OFF/OFF/CBADFAN/OFF
102
      26/3/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/GFF/OFF/OFF/OFF
      26/4/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF
103
104
      26/5/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
105
      26/6/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
106
      26/7/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
      26/8/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
107
108
      26/9/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
109
      26/10/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
110
      26/11/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBADFAN/OFF
111
      26/12/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
112
      26/13/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF
113
      26/14/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
114
      26/15/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
115
      26/16/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
116
```

27/M/420/SF-PERS/255/255/2.57/WATT-SF/ASHRAE2

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CONTENTS OF : C:\JOBS\CB122.TM
LINE # ----
117
       29/1/30/PCT-MCLG/30/PCT-MHTG/0//0
 118
       29/2/0/PCT-MCLG/0/PCT-MHTG/0//0
 119
       29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
 120
       29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
121
      -29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
 122
       29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG
       29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
123
124
       29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG
125
       29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
126
       29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG
127
       29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF
128
       29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
129
      29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
130
      29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
131
      29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
132
      29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
133
      30/1/23725/CFM/23725/CFM
134
      30/2/14660/CFM/14660/CFM////14660/CFM
135
      30/3/360/CFM/360/CFM
136
      30/4/12450/CFM/12450/CFM
137
      30/5/5505/CFM/5505/CFM
138
      30/6/10028/CFM/10028/CFM
139
      30/7/6535/CFM/6535/CFM
140
      30/8/8914/CFM/8914/CFM
141
      30/9/6855/CFM/6855/CFM
142
      30/10/8914/CFM/8914/CFM
143
      30/11/3070/CFM/3070/CFM/////3070/CFM
144
      30/12/180/CFM/180/CFM
145
      30/13/0/CFM/1835/CFM
146
      30/14/10028/CFM/10028/CFM
147
      30/15/8914/CFM/8914/CFM
148
      30/16/8914/CFM/8914/CFM
149
      31/1/1/535/10//135/SINE-FIT/80/50
150
      31/1/2/656/12//135/SINE-FIT/80/50
151
      31/4/1/279/12//135/SINE-FIT/80/50
152
      31/13/1/136/12//135/SINE-FIT/80/50
153
      SYSTEM - 1
154
      39/1/BASE BUILDING
155
      40/1/TRH/ROADK
156
      41/1/1/1/4/4
157
      42/1/3/3/.65
158
      44/1
159
      45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF
160
      40/2/SZ
161
      41/2/2/2/11/11
162
      42/2////.75//.75
163
      44/2
164
      45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
165
      40/3/INDFP
      41/3/3/3/5/5/7/7/9/9/12/12
166
167
      42/3/8/8/1
168
      44/3/DRY-BULB/65/100
169
      45/3/CBADCLG/CBADCLG/OFF/CFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG
170
      40/4/UH
171
      41/4/13/13
172
      42/4/.20
173
      44/4
```

45/4/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

174

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CONTENTS OF : C:\JOBS\CB122.TM
LINE # -----
      40/5/DD
175
176
      41/5/6/6/8/8/10/10
177
       42/5/8/8/1
178
       44/5/DRY-BULB/65/100
179
       45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
180
       40/6/DD
181
       41/6/14/16
182
       42/6/8/8/1
183
       45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
184
       EQUIPMENT - 1
185
       59/1/CARLISLE///BASE BUILDING
      60/1/1/BLKPLANT/1/1/3/3/5/6
186
187
      60/2/2/BLKPLANT/2/2
188
      62/1/EQ1001S/2/306/TONS
189
      62/2/EQ1000
190
      63/1/30/HP/30/HP////1
191
      65/1/1//1/1/3/3/5/6
192
      65/2/2//1/1/3/6
193
      65/3/3//2/2
194
      66/1//1
195
      66/2/2//2
196
      67/1/EQ2101/1/30/HP/11874/MBH/2156/KW
197
      67/2/EQ2101/1/25/HP/2620/MBH/2300/KW
198
      67/3/EQ2000
199
      69/1/EQ4003//EQ4003
200
      69/2/////EQ4003
201
      69/3/EQ4003//EQ4003
202
      69/4
203
      69/5/EQ4003//EQ4003
204
      69/6/EQ4003//EQ4003
205
      74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTGWER/2/50/50/PERCENT
206
      LOAD - 2
207
      19/2/DOUBLE GLAZED WINDOWS
208
      20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10
209
      20/2/2/TOILETS, KITCHEN/1/3520/4/2//11
210
      20/3/3/STAIRS/1/560/4/0//11
      20/4/4/BSMT E/1/12424/4/3.3//12.7
211
212
      20/5/5/1ST FL OFFICES/1/11724/4/1.3//12
213
      20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12
214
      20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7
215
      20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7
216
      20/9/9/3RD FL OFFICES/1/14400/4/1.3//11
217
      20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11
218
      20/11/11/TOILETS W ROOF/1/580/4/2//11
219
      20/12/12/STAIRS W ROOF/1/280/4/0//11
220
      20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7
221
      20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12
222
      20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7
223
      20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11
224
      21/M///CBADCTX///CBADHTX
225
      22/9/1/YES////14
226
      22/10/1/YES////14
227
      22/11/1/YES////14
228
      22/12/1/YES////14
229
      22/16/1/YES////14
230
      24/2/1/9/10.3//134/45
231
      24/2/2/10/10.3//134/315
```

24/3/1/16/11//135/45

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CONTENTS OF : C:\JOBS\CB122.TM
LINE #
233
       24/3/2/48/11//135/135
234
       24/3/3/16/11//135/225
 235
       24/5/1/108/11.3//134/45
236
       24/5/2/281/11.3//134/135
237
       24/5/3/93/11.3//134/225
238
       24/5/4/235/11.3//134/315
239
       24/6/1/9/11.3//134/45
240
       24/6/2/27/11.3//134/135
241
       24/6/3/22/11.3//134/225
242
       24/6/4/56/11.3//134/315
243
       24/7/1/135/10//134/45
244
       24/7/2/320/10//134/135
245
       24/7/3/135/10//134/225
246
       24/7/4/344/10//134/315
247
      24/8/1/8/10//134/135
248
      .24/8/2/8/10//134/315
249
      24/9/1/135/10.3//134/45
250
      24/9/2/320/10.3//134/135
251
      24/9/3/135/10.3//134/225
252
      24/9/4/344/10.3//134/315
253
      24/10/1/8/10.3//134/135
254
      24/10/2/8/10.3//134/315
255
      24/12/1/8/10.3//135/45
256
      24/12/2/24/10.3//135/135
257
      24/12/3/8/10.3//135/225
258
      24/14/1/9/11.3//134/45
259
      24/14/2/27/11.3//134/135
260
      24/14/3/22/11.3//134/225
261
      24/14/4/56/11.3//134/315
262
      24/15/1/8/10//134/135
263
      24/15/2/8/10//134/315
264
      24/16/1/8/10.3//134/135
265
      24/16/2/8/10.3//134/315
266
      25/2/1/8.5/2.5/1/.55/.57
267
      25/3/1/8.5/2.5/6/.55/.57
268
      25/3/3/8.5/2.5/6/.55/.57
269
      25/5/1/8.5/2.5/5/.55/.57
270
      25/5/2/8.5/2.5/35/.55/.57
271
      25/5/3/8.5/2.5/6/.55/.57
272
      25/5/4/8.5/2.5/28/.55/.57
273
      25/6/1/8.5/2.5/5/.55/.57
274
      25/6/2/8.5/2.5/7/.55/.57
275
      25/7/1/7/2.5/6/.55/.57
276
      25/7/2/7/2.5/40/.55/.57
277
      25/7/3/7/2.5/6/.55/.57
278
      25/7/4/7/2.5/40/.55/.57
279
      25/8/1/7/2.5/3/.55/.57
280
      25/8/2/7/2.5/3/.55/.57
281
      25/9/1/7/2.5/6/.55/.57
282
      25/9/2/7/2.5/40/.55/.57
283
      25/9/3/7/2.5/6/.55/.57
284
      25/9/4/7/2.5/40/.55/.57
285
      25/10/1/7/2.5/3/.55/.57
286
      25/10/2/7/2.5/3/.55/.57
287
      25/12/1/7/2.5/3/.55/.57
288
      25/12/3/7/2.5/3/.55/.57
289
      25/14/1/8.5/2.5/5/.55/.57
```

25/14/2/8.5/2.5/7/.55/.57

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CONTENTS OF : C:\JOBS\CB122.TM
LINE # --
 291
      25/15/1/7/2.5/3/.55/.57
292
      25/15/2/7/2.5/3/.55/.57
 293
      25/16/1/7/2.5/3/.55/.57
 294
      25/16/2/7/2.5/3/.55/.57
 295
      26/1/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF
 296
       26/2/CBADP&L/CBADP&L/OFF/AVAIL/CBADFAN/OFF/OFF/OFF/CBADFAN/OFF
 297
       26/3/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/CFF
298
      26/4/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF
 299
       26/5/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
300
       26/6/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
 301
       26/7/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
302
      26/8/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
 303
       26/9/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
304
       26/10/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
:305
      26/11/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBADFAN/OFF
306
       26/12/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
307
       26/13/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF
308
       26/14/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/GFF/OFF/OFF
 309
      26/15/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/GFF/GFF/OFF/OFF
310
      26/16/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
311
       27/M/420/SF-PERS/255/255/2.57/WATT-SF/ASHRAE2
312
      29/1/30/PCT-MCLG/30/PCT-MHTG/0//0
313
      29/2/0/PCT-MCLG/0/PCT-MHTG/0//0
314
      29/3/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
315
      29/4/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
316
      29/5/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
317
      29/6/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF/50/PCT-MCLG
318
      29/7/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
 319
      29/8/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF/50/PCT-MCLG
320
      29/9/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
 321
       29/10/30/PCT-MCLG/30/PCT-MRTG/.53/CFM-SF/.53/CFM-SF/50/PCT-MCLG
322
      29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF
323
      29/12/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
      29/13/0/PCT-MCLG/0/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
324
325
      29/14/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
326
      29/15/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
327
      29/16/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
328
      30/1/23725/CFM/23725/CFM
329
      30/2/14600/CFM/14600/CFM////14660/CFM
330
      30/3/360/CFM/360/CFM
331
      30/4/12450/CFM/12450/CFM
332
      30/5/5505/CFM/5505/CFM
333
      30/6/10028/CFM/10028/CFM
334
      30/7/6535/CFM/6535/CFM
335
      30/8/8914/CFM/8914/CFM
336
      -30/9/6855/CFM/6855/CFM
337
      30/10/8914/CFM/8914/CFM
338
      30/11/3070/CFM/3070/CFM////3070/CFM
339
      30/12/180/CFM/180/CFM
340
      30/13/0/CFM/1835/CFM
341
      30/14/10028/CFM/10028/CFM
342
      30/15/8914/CFM/8914/CFM
343
      30/16/8914/CFM/8914/CFM
344
      31/1/1/535/10//135/SINE-FIT/80/50
345
      31/1/2/656/12//135/SINE-FIT/80/50
346
      31/4/1/279/12//135/SINE-FIT/80/50
347
      31/13/1/136/12//135/SINE-FIT/80/50
348
      SYSTEM - 2
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CONTENTS OF : C:\JOBS\CB122.TM
LINE # -----
 349
       39/2/BOUBLE GLAZED WINDOWS
 350
       40/1/TRH/ROADK
 351
       41/1/1/1/4/4
 352
       42/1/3/3/.65
 353
       44/1
 354
       45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF
 355
       40/2/SZ
 356
       41/2/2/2/11/11
 357
       42/2////.75//.75
 358
       44/2
 359
       45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 360
       40/3/INDFP
 361
       41/3/3/3/5/5/7/7/9/9/12/12
 362
       42/3/8/8/1
 363
       44/3/DRY-BULB/65/100
       45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG
 364
 365
       40/4/UH
 366
       41/4/13/13
 367
       42/4/.20
 368
       44/4
 369
       45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
 370
       40/5/DD
 371
       41/5/6/6/8/8/10/10
 372
       42/5/8/8/1
 373
       44/5/DRY-BUL8/65/100
 374
       45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
 375
       40/6/DD
 376
       41/6/14/16
 377
       42/6/8/8/1
       45/6/CBADCLG/CBADCLG/OFF/CFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
 378
 379
       EQUIPMENT - 2
       59/2/CARLISLE///DOUBLE GLAZED WINDOWS
 380
 381
       60/1/1/BLKPLANT/1/1/3/3/5/6
       .60/2/2/BLKPLANT/2/2
 382
 383
       62/1/EQ1001S/2/306/TONS
 384 62/2/EQ1000
 385
       63/1/30/HP/30/HP////1
 386
       65/1/1//1/1/3/3/5/6
 387
       65/2/2//1/1/3/6
 388
       65/3/3//2/2
       66/1//1
 389
       66/2/2//2
 390
 391
       67/1/EQ2101/1/30/HP/11874/MBH/2156/KW
 392
       67/2/EQ2101/1/25/HP/2620/MBH/2300/KW
 393
       67/3/EQ2000
 394
       69/1/EQ4003//EQ4003
       69/2/////EQ4003
 395
 396
       69/3/EQ4003//EQ4003
 397
       69/4
 398
       69/5/EQ4003//EQ4003
 399
       69/6/EQ4003//EQ4003
       74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT
 400
 401
       LOAD - 3
 402
       19/3/WEATHERSTRIP & CAULKING
       20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10
 403
       20/2/2/TOILETS, KITCHEN/1/3520/4/2//11
 404
 405
       20/3/3/STAIRS/1/560/4/0//11
       20/4/4/BSMT E/1/12424/4/3.3//12.7
```

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CONTENTS OF : C:\JOBS\CB122.TM
LINE # -----
407
      20/5/5/1ST FL OFFICES/1/11724/4/1.3//12
408
      20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12
409
      20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7
410
      20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7
411
      20/9/9/3RD FL OFFICES/1/14400/4/1.3//11
 412
      20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11
413
      20/11/11/TOILETS W ROOF/1/580/4/2//11
 414
       20/12/12/STAIRS W ROOF/1/280/4/0//11
415
      20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7
416
      20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12
417
      20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7
418
      20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11
419
      21/M///CBADCTX///CBADHTX
420
      22/9/1/YES////14
421
      22/10/1/YES////14
422
      22/11/1/YES////14
423
      22/12/1/YES////14
424
      22/16/1/YES////14
425
      24/2/1/9/10.3//134/45
426
      24/2/2/10/10.3//134/315
427
      24/3/1/16/11//135/45
428
      24/3/2/48/11//135/135
429
      24/3/3/16/11//135/225
430
      24/5/1/108/11.3//134/45
431
      24/5/2/281/11.3//134/135
432
      24/5/3/93/11.3//134/225
433
      24/5/4/235/11.3//134/315
434
      24/6/1/9/11.3//134/45
435
      24/6/2/27/11.3//134/135
436
      -24/6/3/22/11.3//134/225
437
      24/6/4/56/11.3//134/315
438
      24/7/1/135/10//134/45
439
      24/7/2/320/10//134/135
440
      24/7/3/135/10//134/225
441
      24/7/4/344/10//134/315
442
      24/8/1/8/10//134/135
      24/8/2/8/10//134/315
443
444
      24/9/1/135/10.3//134/45
445
      24/9/2/320/10.3//134/135
446
      24/9/3/135/10.3//134/225
447
      24/9/4/344/10.3//134/315
448
      24/10/1/8/10.3//134/135
449
      24/10/2/8/10.3//134/315
450
      24/12/1/8/10.3//135/45
451
      24/12/2/24/10.3//135/135
452
      24/12/3/8/10.3//135/225
453
      24/14/1/9/11.3//134/45
454
      24/14/2/27/11.3//134/135
455
      24/14/3/22/11.3//134/225
456
      24/14/4/56/11.3//134/315
457
      24/15/1/8/10//134/135
458
      24/15/2/8/10//134/315
459
      24/16/1/8/10.3//134/135
460
      24/16/2/8/10.3//134/315
461
      25/2/1/8.5/2.5/1/.81/.64
462
      25/3/1/8.5/2.5/6/.81/.64
463
      25/3/3/8.5/2.5/6/.81/.64
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25/5/1/8.5/2.5/5/.81/.64

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CONTENTS OF : C:\JOBS\CB122.TM
LINE #
465
      25/5/2/8.5/2.5/35/.81/.64
466
      25/5/3/8.5/2.5/6/.81/.64
467
      25/5/4/8.5/2.5/28/.81/.64
468
      25/6/1/8.5/2.5/5/.81/.64
469
      25/6/2/8.5/2.5/7/.81/.64
470
      25/7/1/7/2.5/6/.81/.64
471
      25/7/2/7/2.5/40/.81/.64
 472
      25/7/3/7/2.5/6/.81/.64
473
      25/7/4/7/2.5/40/.81/.64
 474
      25/8/1/7/2.5/3/.81/.64
475
      25/8/2/7/2.5/3/.81/.64
476
      25/9/1/7/2.5/6/.81/.64
477
      25/9/2/7/2.5/40/.81/.64
478
      25/9/3/7/2.5/6/.81/.64
479
      25/9/4/7/2.5/40/.81/.64
480
      25/10/1/7/2.5/3/.81/.64
481
      25/10/2/7/2.5/3/.81/.64
 482
      25/12/1/7/2.5/3/.81/.64
483
      25/12/3/7/2.5/3/.81/.64
484
      25/14/1/8.5/2.5/5/.81/.64
485
      25/14/2/8.5/2.5/7/.31/.64
486
      25/15/1/7/2.5/3/.81/.64
      25/15/2/7/2.5/3/.81/.64
487
488
      25/16/1/7/2.5/3/.81/.64
489
      25/16/2/7/2.5/3/.81/.64
490
      26/1/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF
491
      26/2/CBADP&L/CBADP&L/OFF/AVAIL/CBADFAN/OFF/OFF/OFF/CBADFAN/OFF
492
      26/3/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
493
      26/4/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF
494
      26/5/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
495
      26/6/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
496
      26/7/CBADP&L/CBADP&L/CSADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
      26/8/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
497
498
      26/9/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
      26/10/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
499
500
      26/11/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBADFAN/OFF
      26/12/C8ADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
501
502
      26/13/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF
503
      26/14/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
504
      26/15/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
505
      26/16/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
      27/M/420/SF-PERS/255/255/2.57/WATT-SF/ASHRAE2
506
      29/1/30/PCT-MCLG/30/PCT-MHTG/0//0
507
508
      29/2/0/PCT-MCLG/0/PCT-MHTG/0//0
509
      29/3/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
510
      29/4/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
511
      29/5/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
      29/6/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF/50/PCT-MCLG
512
513
      29/7/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
514
      29/8/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF/50/PCT-MCLG
515
      29/9/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
      29/10/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF/50/PCT-MCLG
516
517
      29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF
518
      29/12/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
519
      29/13/0/PCT-MCLG/0/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
520
      29/14/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
521
      29/15/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
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29/16/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF

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CONTENTS OF : C:\JOBS\CB122.TM
LINE # --
523
       30/1/23725/CFM/23725/CFM
524
       30/2/14660/CFM/14660/CFM////14660/CFM
 525
       30/3/360/CFM/360/CFM
 526
       30/4/12450/CFM/12450/CFM
 527
       30/5/5505/CFM/5505/CFM
528
       30/6/10028/CFM/10028/CFM
 529
       30/7/6535/CFM/6535/CFM
 530
       30/8/8924/CFM/8924/CFM
 531
       30/9/6855/CFM/6855/CFM
 532
       30/10/8924/CFM/8924/CFM
533
       30/11/3070/CFM/3070/CFM////3070/CFM
 534
       30/12/180/CFM/180/CFM
535
       30/13/0/CFM/1835/CFM
 536
       30/14/10028/CFM/10028/CFM
 537
      30/15/8914/CFM/8914/CFM
 538
       30/16/8914/CFM/8914/CFM
 539
       31/1/1/535/10//135/SINE-FIT/80/50
 540
       31/1/2/656/12//135/SINE-FIT/80/50
 541
       31/4/1/279/12//135/SINE-FIT/80/50
 542
       31/13/1/136/12//135/SINE-FIT/80/50
 543
       SYSTEM - 3
 544
       39/3/WEATHERSTRIP & CAULKING
 545
       40/1/TRH/ROADK
 546
       41/1/1/1/4/4
 547
       42/1/3/3/.65
 548
       44/1
 549
       45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF
 550
       40/2/SZ
 551
       41/2/2/2/11/11
       42/2///.75//.75
552
 553
       44/2
 554
       45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
 555
       40/3/INDFP
556
       41/3/3/3/5/5/7/7/9/9/12/12
557
       42/3/8/8/1
 558
       44/3/DRY-BULB/65/100
 559
       45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG
560
       40/4/UH
561
       41/4/13/13
       42/4/.20
562
563
       44/4
       45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
564
565
       40/5/DD
566
       41/5/6/6/8/8/10/10
       42/5/8/8/1
567
568
       44/5/DRY-BULB/65/100
569
       45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
570
      40/6/DD
571
       41/6/14/16
572
       42/6/8/8/1
-573
       45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
574
       EQUIPMENT - 3
575
       59/3/CARLISLE///WEATHERSTRIP & CAULKING
576
      60/1/1/BLKPLANT/1/1/3/3/5/6
 577
      60/2/2/BLKPLANT/2/2
578
      62/1/EQ1001S/2/306/TONS
 579
      62/2/EQ1000
580
      63/1/30/HP/30/HP////1
```

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CONTENTS OF : C:\JOBS\CB122.TM
LINE # --
581
       65/1/1//1/1/3/3/5/6
 582
    65/2/2//1/1/3/6
 583
       65/3/3//2/2
 584
       66/1//1
 585
       66/2/2//2
586
       67/1/EQ2101/1/30/HP/11874/MBH/2156/KW
 587
       67/2/EQ2101/1/25/HP/2620/MBH/2300/KW
588
       67/3/EQ2000
 589
       69/1/EQ4003//EQ4003
 590
       69/2/////EQ4003
591
       69/3/EQ4003//EQ4003
592
       69/4
593
       69/5/EQ4003//EQ4003
 594
       69/6/EQ4003//EQ4003
595
      74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT
596
       LOAD - 4
597
       19/4/LOW E GLASS
598
       20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10
 599
       20/2/2/TOILETS, KITCHEN/1/3520/4/2//11
600
      20/3/3/STAIRS/1/560/4/0//11
601
       20/4/4/BSMT E/1/12424/4/3.3//12.7
602
       20/5/5/1ST FL OFFICES/1/11724/4/1.3//12
603
       20/6/6/1ST FL CEN DFFCS/1/9884/4/1.3//12
604
      20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7
605
      20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7
606
      20/9/9/3RD FL OFFICES/1/14400/4/1.3//11
607
      20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11
608
      .20/11/11/TOILETS W ROOF/1/580/4/2//11
609
      20/12/12/STAIRS W ROOF/1/280/4/0//11
610
      20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7
611
      20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12
612
      20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7
613
      20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11
614
      .21/M////CBADCTX///CBADHTX
615
      :22/9/1/YES////14
      22/10/1/YES////14
616
617
      22/11/1/YES////14
618
      22/12/1/YES////14
619
      22/16/1/YES////14
620
      24/2/1/9/10.3//134/45
621
      24/2/2/10/10.3//134/315
622
      24/3/1/16/11//135/45
623
      24/3/2/48/11//135/135
624
      24/3/3/16/11//135/225
625
      24/5/1/108/11.3//134/45
626
      24/5/2/281/11.3//134/135
627
      24/5/3/93/11.3//134/225
628
      24/5/4/235/11.3//134/315
      24/6/1/9/11.3//134/45
629
630
      24/6/2/27/11.3//134/135
631
      24/6/3/22/11.3//134/225
      24/6/4/56/11.3//134/315
632
633
      24/7/1/135/10//134/45
634
      24/7/2/320/10//134/135
635
      24/7/3/135/10//134/225
636
      24/7/4/344/10//134/315
637
      24/8/1/8/10//134/135
638
      24/8/2/8/10//134/315
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CONTENTS OF : C:\JOBS\CB122.TM
LINE # ----
639
      24/9/1/135/10.3//134/45
640
      24/9/2/320/10.3//134/135
641
      24/9/3/135/10.3//134/225
642
      24/9/4/344/10.3//134/315
643
      24/10/1/8/10.3//134/135
644
      24/10/2/8/10.3//134/315
645
      24/12/1/8/10.3//135/45
646
      24/12/2/24/10.3//135/135
647
      24/12/3/8/10.3//135/225
648
      24/14/1/9/11.3//134/45
      24/14/2/27/11.3//134/135
649
650
      24/14/3/22/11.3//134/235
651
      24/14/4/56/11.3//134/315
652
      24/15/1/8/10//134/135
      24/15/2/8/10//134/315
653
654
      24/16/1/8/10.3//134/135
655
      24/16/2/8/10.3//134/315
656
      25/2/1/8.5/2.5/1/.01/.29
657
      25/3/1/8.5/2.5/6/.81/.29
658
      25/3/3/8.5/2.5/6/.81/.23
659
      25/5/1/8.5/2.5/5/.81/.29
660
      25/5/2/8.5/2.5/35/.81/.29
661
      25/5/3/8.5/2.5/6/.31/.29
662
      25/5/4/8.5/2.5/28/.81/.29
      25/6/1/8.5/2.5/5/.81/.29
663
664
      25/6/2/8.5/2.5/7/.81/.29
665
      25/7/1/7/2.5/6/.81/.29
666
      25/7/2/7/2.5/40/.81/.29
667
      25/7/3/7/2.5/6/.81/.29
668
      25/7/4/7/2.5/40/.81/.29
669
      25/8/1/7/2.5/3/.31/.29
670
      25/8/2/7/2.5/3/.81/.29
671
      25/9/1/7/2.5/6/.81/.29
672
      25/9/2/7/2.5/40/.81/.29
673
      25/9/3/7/2.5/6/.81/.29
674
      25/9/4/7/2.5/40/.81/.29
675
      25/10/1/7/2.5/3/.81/.29
676
      25/10/2/7/2.5/3/.81/.29
677
      25/12/1/7/2.5/3/.81/.29
678
      25/12/3/7/2.5/3/.81/.29
679
      25/14/1/8.5/2.5/5/.81/.29
680
      25/14/2/8.5/2.5/7/.81/.29
681
      25/15/1/7/2.5/3/.81/.29
682
      25/15/2/7/2.5/3/.81/.29
683
      25/16/1/7/2.5/3/.81/.29
684
      25/16/2/7/2.5/3/.81/.29
      26/1/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF
685
686
      26/2/CBADP&L/CBADP&L/OFF/AVAIL/CBADFAM/CFF/OFF/OFF/CBADFAM/OFF
687
      26/3/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
688
      26/4/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/GFF/GFF/OFF
      26/5/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
689
690
      26/6/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
691
      26/7/CBADP&L/CBADF&L/CBADFAN/AVAIL/OFF/CBADFAN/GFF/OFF/OFF
692
      26/8/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
693
      26/9/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
694
      26/10/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
695
      26/11/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/CBADFAN/OFF
```

26/12/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

## CONTENTS OF : C:\JOBS\CB122.TM LINE # -----697 26/13/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF 698 ~ 26/14/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/CFF/OFF/OFF/OFF 699 26/15/CBADP&L/CBADP&L/CBADFAN/AYAIL/OFF/CBADFAN/OFF/OFF/OFF/GFF 700 26/16/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/CFF/OFF 701 27/M/420/SF-PERS/255/255/2.57/WATT-SF/ASHRAE2 29/1/30/PCT-MCLG/30/PCT-MHTG/0//0 702 703 29/2/0/PCT-MCLG/0/PCT-MHTG/0//0 704 29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 705 29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 706 29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 707 29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG 708 29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 709 29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG 29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 710 711 \_ 29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG 712 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF 713 29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 714 29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 715 29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 716 29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 717 29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 718 30/1/23725/CFM/23725/CFM 719 30/2/14660/CFM/14660/CFM////14660/CFM 720 30/3/360/CFM/360/CFM 721 30/4/12450/CFM/12450/CFM 722 30/5/5505/CFM/5505/CFM 723 30/6/10028/CFM/10028/CFM 724 30/7/6535/CFM/6535/CFM 725 30/8/8914/CFM/8914/CFM 726 30/9/6855/CFM/6855/CFM 727 30/10/8914/CFM/8914/CFM 728 30/11/3070/CFM/3070/CFM/////3070/CFM 729 30/12/180/CFM/180/CFM 730 30/13/0/CFM/1835/CFM 731 30/14/10028/CFM/10028/CFM 732 30/15/8914/CFM/8914/CFM 733 30/16/8914/CFM/8914/CFM 734 31/1/1/535/10//135/SINE-FIT/80/50 735 31/1/2/656/12//135/SINE-FIT/80/50 31/4/1/279/12//135/SINE-FIT/80/50 736 737 31/13/1/136/12//135/SINE-FIT/80/50 738 SYSTEM - 4 739 39/4/LO₩ E GLASS 740 40/1/TRH/ROADK 741 41/1/1/1/4/4 742 42/1/3/3/.65 743 44/1 744 45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/GBADHTG/CBADHTG/CBACFAH/GFF 745 40/2/SZ 746 41/2/2/2/11/11 747 42/2////.75//.75 748 44/2 749 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF 750 40/3/INDFP 751 41/3/3/3/5/5/7/7/9/9/12/12 752 42/3/8/8/1 753 44/3/DRY-BULB/65/100

45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG

754

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CONTENTS OF : C:\JOBS\CB122.TM
LINE # -----
755
      40/4/UH
756
      41/4/13/13
757
      42/4/.20
758
      44/4
759
      45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
760
       40/5/DD
761
      41/5/6/6/8/8/10/10
762
      42/5/8/8/1
763
      44/5/DRY-BUL8/65/100
764
      45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
765
      40/6/DD
766
      41/6/14/16
      42/6/8/8/1
767
768
      45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
769 EQUIPMENT - 4
      59/4/CARLISLE///LOW E GLASS
770
771
      60/1/1/BLKPLANT/1/1/3/3/5/6
772
      60/2/2/BLKPLANT/2/2
773
      62/1/EQ1001S/2/306/TONS
774
      62/2/EQ1000
775
      63/1/30/HP/30/HP////1
776
      65/1/1//1/1/3/3/5/6
777
      65/2/2//1/1/3/6
778
      65/3/3//2/2
779
      66/1//1
780
      66/2/2//2
781
      67/1/EQ2101/1/30/HP/11874/M3H/2156/KW
782
      67/2/E92101/1/25/HP/2620/M8H/2300/KW
783
      67/3/EQ2000
784
      69/1/EQ4003//EQ4003
785
      69/2/////EQ4003
786
      69/3/EQ4003//EQ4003
787
      69/4
788
      69/5/EQ4003//EQ4003
789
      69/6/EQ4003//EQ4003
      74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT
790
```

```
CONTENTS OF : C:\JOBS\CB122B.TM
LINE # ---
  1
       JOB - 1
  2
      O1/ENERGY SAVINGS OPPORTUNITY STUDY
  3
       01/CARLISLE BARRACKS, PA
  4
       01/DEPARTMENT OF THE ARMY
:715
       01/BENATEC ASSOCIATES
  6
       01/BUILDING 122
  7
       08/CARLISLE
       09/MAY/SEP////APR/OCT
 9
       10/CLTD-CLF
 -10
       11///ZONE
 11
      LOAD - 1
 12
       19/1/REPLACE FLUORESCENT LAMPS
 13
       20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10
-14
       .20/2/2/TOILETS, KITCHEN/1/3520/4/2//11
 15
       20/3/3/STAIRS/1/560/4/0//11
 16
       20/4/4/BSMT E/1/12424/4/3.3//12.7
 17
       20/5/5/1ST FL OFFICES/1/11724/4/1.3//12
 18
       20/6/6/1ST FL CEN OFFCS/1/3884/4/1.3//12
 19
       20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7
 20
       20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7
 21
       20/9/9/3RD FL OFFICES/1/14400/4/1.3//11
 22
       20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11
 23
       20/11/11/TOILETS W ROOF/1/580/4/2//11
 24
       20/12/12/STAIRS W ROOF/1/280/4/0//11
 25
      20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7
 26
      20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12
 27
      20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7
 28
      20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11
 29
      21/M///CBADCTX///CBADHTX
 30
      22/9/1/YES////14
      22/10/1/YES////14
 31
 32
      22/11/1/YES////14
 33
      22/12/1/YES////14
 34
      22/16/1/YES////14
 35
      24/2/1/9/10.3//134/45
      24/2/2/10/10.3//134/315
 36
 37
      24/3/1/16/11//135/45
 38
      24/3/2/48/11//135/135
 39
      24/3/3/16/11//135/225
 40
      24/5/1/108/11.3//134/45
 41
      24/5/2/281/11.3//134/135
 42
      24/5/3/93/11.3//134/225
 43
      24/5/4/235/11.3//134/315
 44
      24/6/1/9/11.3//134/45
      24/6/2/27/11.3//134/135
 45
 46
      24/6/3/22/11.3//134/225
 47
      .24/6/4/56/11.3//134/315
 48
      24/7/1/135/10//134/45
      24/7/2/320/10//134/135
 49
 50
      24/7/3/135/10//134/225
      24/7/4/344/10//134/315
 51
 52
      24/8/1/8/10//134/135
 53
      24/8/2/8/10//134/315
 54
      24/9/1/135/10.3//134/45
 55
      24/9/2/320/10.3//134/135
      24/9/3/135/10.3//134/225
 56
      24/9/4/344/10.3//134/315
 57
```

24/10/1/8/10.3//134/135

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CONTENTS OF : C:\JOBS\C81228.TM
LINE #
  59
       24/10/2/8/10.3//134/315
       24/12/1/8/10.3//135/45
  60
  61
       24/12/2/24/10.3//135/135
  62
       24/12/3/8/10.3//135/225
  63
       24/14/1/9/11.3//134/45
  64
       24/14/2/27/11.3//134/135
  65
       24/14/3/22/11.3//134/225
       24/14/4/56/11.3//134/315
     24/15/1/8/10//134/135
  67
  68
       24/15/2/8/10//134/315
 69
       24/16/1/8/10.3//134/135
  70
       24/16/2/8/10.3//134/315
  71
       25/2/1/8.5/2.5/1/.81/.64
 72
       25/3/1/8.5/2.5/6/.81/.64
  73
       25/3/3/8.5/2.5/6/.81/.64
  74
       25/5/1/8.5/2.5/5/.81/.64
  75
       25/5/2/8.5/2.5/35/.81/.64
  76
       25/5/3/8.5/2.5/6/.81/.64
  77
       25/5/4/8.5/2.5/28/.81/.64
  78
       25/6/1/8.5/2.5/5/.81/.64
  79
       25/6/2/8.5/2.5/7/.81/.64
  80
       25/7/1/7/2.5/6/.81/.64
  81
       25/7/2/7/2.5/40/.81/.64
  82
       25/7/3/7/2.5/6/.81/.64
  83
       25/7/4/7/2.5/40/.81/.64
  84
       25/8/1/7/2.5/3/.81/.64
 85
       25/8/2/7/2.5/3/.81/.64
  86
       25/9/1/7/2.5/6/.81/.64
 87
       25/9/2/7/2.5/40/.81/.64
  88
       25/9/3/7/2.5/6/.81/.64
 89
       25/9/4/7/2.5/40/.81/.64
  90
       25/10/1/7/2.5/3/.81/.64
 91
       25/10/2/7/2.5/3/.81/.64
  92
       25/12/1/7/2.5/3/.81/.64
 93
       25/12/3/7/2.5/3/.81/.64
  94
       25/14/1/8.5/2.5/5/.81/.64
  95
       25/14/2/8.5/2.5/7/.81/.64
  96
       25/15/1/7/2.5/3/.81/.64
  97
       .25/15/2/7/2.5/3/.81/.64
  98
       25/16/1/7/2.5/3/.81/.64
 99
       25/16/2/7/2.5/3/.81/.64
100
       26/1/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF
101
       26/2/CBADP&L/CBADP&L/OFF/AVAIL/CBADFAN/OFF/OFF/OFF/CBADFAN/OFF
       26/3/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
102
103
       26/4/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF
104
       26/5/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
105
       26/6/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
 106
       26/7/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
107
       26/8/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
108
       26/9/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
109
       26/10/CBADP&L/CBADP&L/CBADFAN/AYAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
110
       26/11/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBADFAN/OFF
111
       26/12/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
 112
       26/13/CBADP&L/CBADP&L/CFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF
113
       26/14/CBADP&L/CBADP&L/CSADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/GFF
114
       26/15/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
115
       26/16/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
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27/M/420/SF-PERS/255/255/2.31/WATT-SF/ASHRAE2

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CONTENTS OF : C:\JOBS\C81228.TM
LINE # -----
117
      29/1/30/PCT-MCLG/30/PCT-MHTG/0//0
118
      29/2/0/PCT-MCLG/0/PCT-MHTG/0//0
119
      29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
120
      29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
      29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
122 29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG
123
      29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
124 | 29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG
125 - 29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
126
     29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG
127
      -29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF
128
      29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
129
      29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
130
      29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
131
      .29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
132
      29/16/30/PCT-MCLG/30/FCT-MHTG/.6/CFM-SF/.6/CFM-SF
133
      30/1/23725/CFM/23725/CFM
134
      30/2/14660/CFM/14660/CFM/////14660/CFM
      30/3/360/CFM/360/CFM
135
136
      30/4/12450/0FM/12450/0FM
137
      30/5/5505/CFM/5505/CFM
138
      .30/6/10028/CFM/10028/CFM
139
      30/7/6535/CFM/6535/CFM
140
      30/8/8914/CFM/8914/CFM
141
      30/9/6855/CFM/6855/CFM
142
      30/10/8914/CFM/8914/CFM
143
      30/11/3070/CFM/3070/CFM/////3070/CFM
144
      30/12/180/CFM/180/CFM
145
      30/13/0/CFM/1835/CFM
146
      30/14/10028/CFM/10028/CFM
147
      30/15/8914/CFM/8914/CFM
148
      30/16/8914/CFM/8914/CFM
      31/1/1/535/10//135/SINE-FIT/80/50
149
150
      31/1/2/656/12//135/SINE-FIT/80/50
151
      .31/4/1/279/12//135/SINE-FIT/80/50
152
      31/13/1/136/12//135/SINE-FIT/80/50
153
      SYSTEM - 1
154
      39/1/REPLACE FLUORESCENT LAMPS
155
      40/1/TRH/ROADK
156
      41/1/1/1/4/4
157
      42/1/3/3/.65
158
      44/1
      45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF
159
160
      40/2/SZ
      41/2/2/2/11/11
161
162
      42/2///.75//.75
163
      44/2
164
      45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
165
      40/3/INDFP
166
      41/3/3/3/5/5/7/7/9/9/12/12
167
      42/3/8/8/1
168
      44/3/DRY-BULB/65/100
      45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG
169
170
      40/4/UH
171
      41/4/13/13
172
      42/4/.20
173
      44/4
174
      45/4/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
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CONTENTS OF : C:\JOBS\CB122B.TM
LINE # --
175
       40/5/DD
176
       41/5/6/6/8/8/10/10
177
       42/5/8/8/1
178
       44/5/DRY-BULB/65/100
179
       45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
180
       40/6/DD
181
       41/6/14/16
182
       42/6/8/8/1
183
       45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
184
       EQUIPMENT - 1
 185
       59/1/CARLISLE///REPLACE FLUCRESCENT LAMPS
186
       60/1/1/BLKPLANT/1/1/3/3/5/6
187
       60/2/2/BLKPLANT/2/2
188
      62/1/EQ1001S/2/306/TONS
189
       62/2/E01000
190
      [63/1/30/HP/30/HP////1
191
       65/1/1//1/1/3/3/5/6
192
       65/2/2//1/1/3/6
193
       65/3/3//2/2
194
      66/1//1
195
       66/2/2//2
196
       67/1/EQ2101/1/30/HP/11874/M8H/2156/KW
197
       67/2/EQ2101/1/25/HP/2620/MBH/2300/KW
198
       67/3/EQ2000
199
      69/1/EQ4003//EQ4003
200
       69/2/////EQ4003
201
      69/3/EQ4003//EQ4003
202
      69/4
203
      69/5/EQ4003//EQ4003
204
      69/6/EQ4003//EQ4003
205
      74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT
206
      LOAD - 2
207
      19/2/REPLACE FLUORESCENT BALLASTS
208
      20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10
209 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11
210
      20/3/3/STAIRS/1/560/4/0//11
211
      20/4/4/BSMT E/1/12424/4/3.3//12.7
212
      20/5/5/1ST FL OFFICES/1/11724/4/1.3//12
213
      20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12
214
      20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7
215
      20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7
216
      20/9/9/3RD FL OFFICES/1/14400/4/1.3//11
217
      20/10/10/3RD FL CEN DFFCS/1/8563/4/0//11
218
      20/11/11/TOILETS W ROOF/1/580/4/2//11
219
      20/12/12/STAIRS W ROOF/1/280/4/0//11
220
      20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7
221
      20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12
222
      20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7
223
      20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11
224
      21/M///CBADCTX///CBADHTX
225
      22/9/1/YES////14
226
      22/10/1/YES////14
227
      22/11/1/YES////14
228
      22/12/1/YES////14
229
      22/16/1/YES////14
230
      24/2/1/9/10.3//134/45
231
      24/2/2/10/10.3//134/315
232
      24/3/1/16/11//135/45
```

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CONTENTS OF : C:\JOBS\CB122B.TM
LINE #
 233
       24/3/2/48/11//135/135
234
       24/3/3/16/11//135/225
235
       24/5/1/108/11.3//134/45
236
       24/5/2/281/11.3//134/135
237
       24/5/3/93/11.3//134/225
238
       24/5/4/235/11.3//134/315
239
       24/6/1/9/11.3//134/45
240
       24/6/2/27/11.3//134/135
241
       24/6/3/22/11.3//134/225
242
       24/6/4/56/11.3//134/315
243
       -24/7/1/135/10//134/45
244
       24/7/2/320/10//134/135
245
       24/7/3/135/10//134/225
246
       24/7/4/344/10//134/315
247
       24/8/1/8/10//134/135
248
       24/8/2/8/10//134/315
249
       24/9/1/135/10.3//134/45
250
       24/9/2/320/10.3//134/135
251
       24/9/3/135/10.3//134/225
252
       24/9/4/344/10.3//134/315
253
       24/10/1/8/10.3//134/135
254
       24/10/2/8/10.3//134/315
255
       24/12/1/8/10.3//135/45
256
       24/12/2/24/10.3//135/135
257
       24/12/3/8/10.3//135/225
258
      24/14/1/9/11.3//134/45
259
      24/14/2/27/11.3//134/135
260
       24/14/3/22/11.3//134/225
261
       24/14/4/56/11.3//134/315
262
      24/15/1/8/10//134/135
263
      24/15/2/8/10//134/315
264
      24/16/1/8/10.3//134/135
265
      24/16/2/8/10.3//134/315
266
      25/2/1/8.5/2.5/1/.81/.64
267
      25/3/1/8.5/2.5/6/.81/.64
268
      25/3/3/8.5/2.5/6/.81/.64
269
      25/5/1/8.5/2.5/5/.81/.64
270
      25/5/2/8.5/2.5/35/.81/.64
271
      25/5/3/8.5/2.5/6/.81/.64
272
      25/5/4/8.5/2.5/28/.81/.64
273
      25/6/1/8.5/2.5/5/.81/.64
274
      25/6/2/8.5/2.5/7/.81/.64
275
      25/7/1/7/2.5/6/.81/.64
276
      25/7/2/7/2.5/40/.81/.64
277
      25/7/3/7/2.5/6/.81/.64
278
      25/7/4/7/2.5/40/.81/.64
279
      25/8/1/7/2.5/3/.81/.64
280
      25/8/2/7/2.5/3/.81/.64
281
      25/9/1/7/2.5/6/.81/.64
282
      25/9/2/7/2.5/40/.81/.64
283
      25/9/3/7/2.5/6/.81/.64
284
      25/9/4/7/2.5/40/.81/.64
285
      25/10/1/7/2.5/3/.81/.64
286
      25/10/2/7/2.5/3/.81/.64
287
      25/12/1/7/2.5/3/.81/.64
288
      25/12/3/7/2.5/3/.81/.64
289
      25/14/1/8.5/2.5/5/.81/.64
```

25/14/2/8.5/2.5/7/.81/.64

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CONTENTS OF : C:\JOBS\CB122B.TM
LINE # --
 291
       25/15/1/7/2.5/3/.81/.64
 292
       25/15/2/7/2.5/3/.81/.64
 293
       25/16/1/7/2.5/3/.81/.64
 294
       25/16/2/7/2.5/3/.81/.64
 295
       26/1/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF
 296
       26/2/CBADP&L/CBADP&L/OFF/AVAIL/CBADFAN/OFF/OFF/GFF/CBADFAN/OFF
       26/3/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
 297
       26/4/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF
 298
 299
       26/5/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
 300
       26/6/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
 301
       26/7/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
 302
       26/8/CBADP&L/CBADP&L/CBADFAN/AYAIL/OFF/CBADFAN/DFF/OFF/OFF/OFF
       26/9/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
 303
 304
       26/10/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
 305
       ·26/11/CBADP&L/CBADP&L/OFF/AYAIL/OFF/OFF/OFF/OFF/CBADFAN/OFF
 306
       26/12/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
 307
       26/13/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF
 308
       26/14/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
 309
       26/15/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
       26/16/CBADP&L/CBADP&L/CBADFAN/AYAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
 310
 311
       27/M/420/SF-PERS/255/255/2.00/WATT-SF/ASHRAE2
 312
       29/1/30/PCT-MCLG/30/PCT-MHTG/0//0
 313
       29/2/0/PCT-MCLG/0/PCT-MHTG/0//0
 314
       29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
 315
       29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
 316
       29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
       29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG
 317
 318
       29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
 319
       29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG
 320
       29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
 321
       29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG
 322
       29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF
 323
       29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
 324
       29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
 325
       29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
 326
       29/15/30/PCT-MCLG/30/PCT-MKTG/.6/CFM-SF/.6/CFM-SF
 327
       29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
 328
       30/1/23725/CFM/23725/CFM
  329
       30/2/14660/CFM/14660/CFM////14660/CFM
 330
       30/3/360/CFM/360/CFM
  331
       30/4/12450/CFM/12450/CFM
 332
       30/5/5505/CFM/5505/CFM
  333
       30/6/10028/CFM/10028/CFM
 334
       30/7/6535/CFM/6535/CFM
 335
       30/8/8914/CFM/8914/CFM
 336
       30/9/6855/CFM/6855/CFM
  337
        30/10/8914/CFM/8914/CFM
  338
        30/11/3070/CFM/3070/CFM////3070/CFM
 339
        30/12/180/CFM/180/CFM
 340
        30/13/0/CFM/1835/CFM
  341
        30/14/10028/CFM/10028/CFM
  342
       30/15/8914/CFM/8914/CFM
  343
       ~30/16/8914/CFM/8914/CFM
       31/1/1/535/10//135/SINE-FIT/80/50
  344
  345
        31/1/2/656/12//135/SINE-FIT/80/50
        31/4/1/279/12//135/SINE-FIT/80/50
  346
  347
        31/13/1/136/12//135/SINE-FIT/80/50
  348
       SYSTEM - 2
```

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CONTENTS OF : C:\JOBS\CB122B.TM
LINE # -----
349
      39/2/REPLACE FLUORESCENT BALLASTS
350
      40/1/TRH/ROADK
 351
      41/1/1/1/4/4
352
      42/1/3/3/.65
353
      44/1
 354
      %5/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF
355
      40/2/SZ
 356
      41/2/2/2/11/11
357
      42/2///.75//.75
 358
      44/2
359
      45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
360
       40/3/INDFP
361
      41/3/3/3/5/5/7/7/9/9/12/12
362
      42/3/8/8/1
363 44/3/DRY-BULB/65/100
364
      45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG
365
      40/4/UH
 366
      41/4/13/13
367
      42/4/.20
368
      44/4
369
      45/4/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
370
      40/5/00
371
      41/5/6/6/8/8/10/10
372
      42/5/8/8/1
373
      44/5/DRY-BULB/65/100
374
      45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
375
      40/6/00
376
      41/6/14/16
377
      42/6/8/8/1
378
      45/6/CBADGLG/GSADGLG/OFF/GFF/GFF/GSADHTG/GBADHTG/OFF/GBADFAN/OFF
379
      EQUIPMENT - 2
      59/2/CARLISLE///REPLACE FLUORESCENT BALLASTS
380
      60/1/1/BLKPLANT/1/1/3/3/5/6
381
382
      60/2/2/BLKPLANT/2/2
383 62/1/EQ10015/2/306/TOMS
384
     .62/2/EQ1000
385 63/1/30/HP/30/HP////1
386
      65/1/1//1/1/3/3/5/6
387
      65/2/2//1/1/3/6
388 65/3/3//2/2
389 66/1//1
390
      66/2/2//2
391 - 67/1/EQ2101/1/30/HP/11874/MBH/2156/KW
392
      67/2/EQ2101/1/25/HP/2620/MBH/2300/KW
393 67/3/E02000
394
      69/1/EQ4003//EQ4003
395
      69/2/////EQ4003
396
      69/3/EQ4003//EQ4003
397
      69/4
398
      69/5/EQ4003//EQ4003
399
      69/6/EQ4003//EQ4003
      74/1/EQ5100/750/TONS/.031/KW-TON/I-WATER/CTOWER/2/50/50/PERCENT
400
401
      LOAD - 3
402
      19/3/REPLACE FLUORESCENT FIXTURES
403
      20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10
404
      20/2/2/TOILETS, KITCHEN/1/3520/4/2//11
405
      20/3/3/STAIRS/1/560/4/0//11
      20/4/4/BSMT E/1/12424/4/3.3//12.7
```

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CONTENTS OF : C:\JOBS\CB122B.TM
LINE #
407
       20/5/5/1ST FL OFFICES/1/11724/4/1.3//12
408
       20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12
409
       20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7
410
       20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7
411
       20/9/9/3RD FL OFFICES/1/14400/4/1.3//11
412
       20/10/10/3RD FL CEN CFFCS/1/8563/4/0//11
413
       20/11/11/TOILETS W ROOF/1/580/4/2//11
414
       20/12/12/STAIRS W ROOF/1/280/4/0//11
415
       20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7
416
       20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12
417
       20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7
418
       20/16/16/3RD FL CEM OFFCS/8563/1/4/0//11
419
       21/M////CBADCTX///CEACHIX
420
       22/9/1/YES////14
421
      :22/10/1/YES////14
422
       22/11/1/YES////14
423
       22/12/1/YES////14
 424
       22/16/1/YES////14
 425
       24/2/1/9/10.3//134/45
426
       24/2/2/10/10.3//134/315
427
       24/3/1/16/11//135/45
 428
       24/3/2/48/11//135/135
429
       24/3/3/16/11//135/225
 430
       24/5/1/108/11.3//134/45
431
       24/5/2/281/11.3//134/135
432
       24/5/3/93/11.3//134/225
433
       24/5/4/235/11.3//134/315
434
       24/6/1/9/11.3//134/45
435
       24/6/2/27/11.3//134/.35
436
       24/6/3/22/11.3//134/225
437
       24/6/4/56/11.3//134/315
438
       24/7/1/135/10//134/45
439
       24/7/2/320/10//134/135
 440
       24/7/3/135/10//134/225
441
       24/7/4/344/10//134/315
442
       24/8/1/8/10//134/135
443
       24/8/2/8/10//134/315
444
       -24/9/1/135/10.3//134/45
445
       24/9/2/320/10.3//134/135
446
       24/9/3/135/10.3//134/225
447
       24/9/4/344/10.3//134/315
448
       24/10/1/8/10.3//134/135
449
       24/10/2/8/10.3//134/315
450
       24/12/1/8/10.3//135/45
451
       24/12/2/24/10.3//135/135
452
       24/12/3/8/10.3//135/225
453
       24/14/1/9/11.3//134/45
454
       24/14/2/27/11.3//134/135
455
       24/14/3/22/11.3//134/225
       24/14/4/56/11.3//134/315
456
       24/15/1/8/10//134/135
457
458
       24/15/2/8/10//134/315
459
       24/16/1/8/10.3//134/135
460
       24/16/2/8/10.3//134/315
461
       25/2/1/8.5/2.5/1/.81/.64
462
       25/3/1/8.5/2.5/6/.81/.64
463
```

25/3/3/8.5/2.5/6/.81/.64

25/5/1/8.5/2.5/5/.81/.64

464

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CONTENTS OF : C:\JOBS\CB122B.TM
LINE # -----
465
      25/5/2/8.5/2.5/35/.81/.64
466
      25/5/3/8.5/2.5/6/.81/.64
467
      25/5/4/8.5/2.5/28/.81/.64
468
      25/6/1/8.5/2.5/5/.81/.64
469
      25/6/2/8.5/2.5/7/.81/.64
470
      25/7/1/7/2.5/6/.81/.64
471
      25/7/2/7/2.5/40/.81/.64
472
      25/7/3/7/2.5/6/.81/.64
473
      25/7/4/7/2.5/40/.81/.64
474
      25/8/1/7/2.5/3/.81/.64
475
      25/8/2/7/2.5/3/.81/.64
476
      25/9/1/7/2.5/6/.81/.64
477
      25/9/2/7/2.5/40/.81/.64
478
      25/9/3/7/2.5/6/.81/.64
479
      25/9/4/7/2.5/40/.81/.64
480
      25/10/1/7/2.5/3/.81/.64
481
      25/10/2/7/2.5/3/.81/.64
482
      25/12/1/7/2.5/3/.81/.64
483
      25/12/3/7/2.5/3/.81/.64
484
      25/14/1/8.5/2.5/5/.81/.64
485
      25/14/2/8.5/2.5/7/.81/.64
486
      25/15/1/7/2.5/3/.81/.64
487
      25/15/2/7/2.5/3/.81/.64
488
      25/16/1/7/2.5/3/.81/.64
489
      25/16/2/7/2.5/3/.81/.64
490
      26/1/CBADP&L/CBADP&L/CBACFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF
      26/2/CBADP&L/CBADP&L/OFF/AVAIL/CBADFAN/OFF/OFF/CBADFAN/OFF
491
492
      26/3/CBADP&L/CBADP&L/CBAGFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
493
      26/4/CBADP&L/CBADP&L/CBADFAN/GFF/CBADFAN/CBADFAN/OFF/OFF/OFF
494
      26/5/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
495
      26/6/CBADP&L/CBADP&L/CBADFAN/AYAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
496
      26/7/CBADP&L/CBADP&L/CEADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
497
      26/8/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
498
      26/9/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
499
      26/10/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
500
      26/11/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBADFAN/OFF
      26/12/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
501
502
      26/13/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF
      26/14/CBADP&L/CBADP&L/CBADFAN/AVAIL/CFF/CBADFAN/OFF/OFF/OFF/OFF
503
      26/15/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
504
      26/16/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
505
506
      27/M/420/SF-PERS/255/255/1.66/WATT-SF/ASHRAE2
      29/1/30/PCT-MCLG/30/PCT-MHTG/0//0
507
508
      29/2/0/PCT-MCLG/0/PCT-MHTG/0//0
509
      29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
510
      29/4/30/PCT-MCLG/30/PCT-NHTG/.6/CFM-SF/.6/CFM-SF
      29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
511
      29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG
512
513
      29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
      29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG
514
515
      29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
516
      29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG
517
      29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF
518
      29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
519
      29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
520
      29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
521
      29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF
```

29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

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CONTENTS OF : C:\JOBS\CB122B.TM
LINE # ----
523
      30/1/23725/CFM/23725/CFM
524
      30/2/14660/CFM/14660/CFM////14660/CFM
525
      30/3/360/CFM/360/CFM
526
      30/4/12450/CFM/12450/CFM
527
      30/5/5505/CFM/5505/CFM
528
      30/6/10028/CFM/10028/CFM
529
      30/7/6535/CFM/6535/CFM
530
      30/8/8914/CFM/8914/CFM
531
      30/9/6855/CFM/6855/CFM
532
      30/10/8914/CFM/8914/CFM
533
      30/11/3070/CFM/3070/CFM/////3070/CFM
534
      :30/12/180/CFM/180/CFM
535
      30/13/0/CFM/1835/OFM
      30/14/10028/CFM/10028/CFM
536
537
      30/15/8914/CFM/8914/CFM
538
      30/16/8914/CFM/8914/CFM
539
      31/1/1/535/10//135/SINE-FIT/80/50
540
      31/1/2/656/12//135/SINE-FIT/80/50
541
      31/4/1/279/12//135/SINE-FIT/80/50
542
      31/13/1/136/12//135/SINE-FIT/80/50
543
      SYSTEM - 3
544
      39/3/REPLACE FLUORESCENT FIXTURES
545
      40/1/TRH/ROADK
546
      41/1/1/1/4/4
547
      42/1/3/3/.65
548
      44/1
      45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF
549
550
      40/2/SZ
551
      41/2/2/2/11/11
552
      42/2///.75//.75
553
      44/2
554
      555
      40/3/INDFP
556
      41/3/3/3/5/5/7/7/9/9/12/12
557
      42/3/8/8/1
558
      44/3/DRY-BULB/65/100
559
      45/3/CBADCLG/CBADCLG/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG
560
      40/4/UH
      41/4/13/13
561
562
      42/4/.20
563
      44/4
564
      45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
565
     40/5/DD
566
     41/5/6/6/8/8/10/10
567
     42/5/8/8/1
568
     44/5/DRY-BULB/65/100
569
     45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
570
     40/6/DD
571
     41/6/14/16
572
     42/6/8/8/1
573
     45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
574
     EQUIPMENT - 3
575
     59/3/CARLISLE///REPLACE FLUORESCENT FIXTURES
576
     60/1/1/8LKPLANT/1/1/3/3/5/6
577
     60/2/2/BLKPLANT/2/2
578
     62/1/EQ1001S/2/306/TONS
579
     62/2/EQ1000
     63/1/30/HP/30/HP////1
```

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CONTENTS OF : C:\JOBS\CB122B.TM
LINE # -----
581
      65/1/1//1/1/3/3/5/6
582
       65/2/2//1/1/3/6
583
       65/3/3//2/2
584
       66/1//1
585
       66/2/2//2
586
      %67/1/EQ2101/1/30/HP/11874/MBH/2156/KW
587
       .67/2/EQ2101/1/25/HP/2620/MBH/2300/KW
588
       .67/3/EQ2000
589
    69/1/EQ4003//EQ4003
590
       :69/2/////EQ4003
591
       69/3/EQ4003//EQ4003
592
       69/4
593
      69/5/EQ4003//EQ4003
594
       69/6/EQ4003//EQ4003
595 274/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT
596
      LOAD - 4
597
      -19/4/HEAT RECOVERY
598
       20/1/1/SUB BSMT, B3MT W/1/45125/4/1//10
599
       20/2/2/TOILETS, KITCHEN/1/3520/4/2//11
600
       20/3/3/STAIRS/1/560/4/0//11
601
       20/4/4/BSMT E/1/12424/4/3.3//12.7
602
       20/5/5/1ST FL OFFICES/1/11724/4/1.3//12
603
       20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12
604
       20/7/7/2MD FL OFFICES/1/14400/4/1.3//10.7
605
      20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7
606
      20/9/9/3RD FL OFFICES/1/14400/4/1.3//11
607
       20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11
608
       20/11/11/TOILETS W ROOF/1/580/4/2//11
609
      20/12/12/STAIRS W ROOF/1/280/4/0//11
610
      20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7
611
       20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12
612
      20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7
613
      20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11
614
      21/M///CBADCTX///CBADHTX
615
      22/9/1/YES////14
616
      22/10/1/YES////14
617
      22/11/1/YES////14
618
      22/12/1/YES////14
      22/16/1/YES////14
619
620
      24/2/1/9/10.3//134/45
621
      24/2/2/10/10.3//134/315
622
      24/3/1/16/11//135/45
623
      24/3/2/48/11//135/135
624
      24/3/3/16/11//135/225
625
      24/5/1/108/11.3//134/45
626
      24/5/2/281/11.3//134/135
627
      24/5/3/93/11.3//134/225
628
      24/5/4/235/11.3//134/315
629
      24/6/1/9/11.3//134/45
630
      24/6/2/27/11.3//134/135
631
      24/6/3/22/11.3//134/225
632
      24/6/4/56/11.3//134/315
633
      24/7/1/135/10//134/45
634
      24/7/2/320/10//134/135
635
      24/7/3/135/10//134/225
636
      24/7/4/344/10//134/315
637
      24/8/1/8/10//134/135
      24/8/2/8/10//134/315
```

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CONTENTS OF : C:\JOBS\C81228.TM
LINE #
639
       24/9/1/135/10.3//134/45
640
       24/9/2/320/10.3//134/135
 641
       24/9/3/135/10.3//134/225
642
      24/9/4/344/10.3//134/315
      24/10/1/8/10.3//134/135
643
644
      24/10/2/8/10.3//134/315
645
      24/12/1/8/10.3//135/45
646
      24/12/2/24/10.3//135/135
647
       24/12/3/8/10.3//135/225
648
      24/14/1/9/11.3//134/45
649
      24/14/2/27/11.3//134/135
650
      24/14/3/22/11.3//134/225
651
      24/14/4/56/11.3//134/315
652
      24/15/1/8/10//134/135
653
      24/15/2/8/10//134/315
654
      24/16/1/8/10.3//134/135
655
      24/16/2/8/10.3//134/315
656
      25/2/1/8.5/2.5/1/.81/.64
657
      25/3/1/8.5/2.5/6/.81/.64
658
      25/3/3/8.5/2.5/6/.81/.64
659
      25/5/1/8.5/2.5/5/.81/.64
      25/5/2/8.5/2.5/35/.81/.64
660
661
      25/5/3/8.5/2.5/6/.81/.64
662
      25/5/4/8.5/2.5/28/.81/.64
663
      25/6/1/8.5/2.5/5/.81/.64
      25/6/2/8.5/2.5/7/.81/.64
664
665
      25/7/1/7/2.5/6/.81/.64
666
      25/7/2/7/2.5/40/.81/.64
667
      25/7/3/7/2.5/6/.81/.64
668
      25/7/4/7/2.5/40/.81/.64
669
      25/8/1/7/2.5/3/.81/.64
670
      25/8/2/7/2.5/3/.81/.64
671
      25/9/1/7/2.5/6/.81/.64
672
      25/9/2/7/2.5/40/.81/.64
673
      25/9/3/7/2.5/6/.81/.64
674
      25/9/4/7/2.5/40/.81/.64
675
      25/10/1/7/2.5/3/.81/.64
676
      25/10/2/7/2.5/3/.81/.64
677
      25/12/1/7/2.5/3/.81/.64
678
      25/12/3/7/2.5/3/.81/.64
679
      25/14/1/8.5/2.5/5/.81/.64
680
      25/14/2/8.5/2.5/7/.81/.64
681
      25/15/1/7/2.5/3/.81/.64
682
      25/15/2/7/2.5/3/.81/.64
683
      25/16/1/7/2.5/3/.81/.64
684
      25/16/2/7/2.5/3/.81/.64
685
      26/1/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF
686
      26/2/CBADP&L/CBADP&L/OFF/AVAIL/CBADFAN/OFF/OFF/OFF/CBADFAN/OFF
687
      26/3/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
688
      26/4/CBADP&L/CBADPAL/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF
689
      26/5/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
690
      26/6/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
691
      26/7/CBADP&L/CBADP&L/CBADFAN/AYAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
692
      26/8/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
693
      26/9/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
694
      26/10/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
695
      26/11/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/CBADFAN/OFF
696
      26/12/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
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## CONTENTS OF : C:\JOBS\CB122B.TM LINE # 697 26/13/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF 698 26/14/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF 699 26/15/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF 700 26/16/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF 701 27/M/420/SF-PERS/255/255/2.57/WATT-SF/ASHRAE2 702 29/1/30/PCT-MCLG/30/PCT-MHTG/0//0 703 29/2/0/PCT-MCLG/0/PCT-MHTG/0//0 704 **29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF** 705 29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 706 29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 707 29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG 708 29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 709 29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG 710 29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 711 29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF 712 713 29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 714 29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 715 29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 716 29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF 717 29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.5/CFH-SF 718 30/1/23725/CFM/23725/CFM 719 30/2/14660/CFM/14660/CFM////14660/CFM 720 30/3/360/CFM/360/CFM 721 30/4/12450/CFM/12450/CFM 722 30/5/5505/CFM/5505/CFM 723 30/6/10028/CFM/10028/CFM 724 30/7/6535/CFM/6535/CFM 725 30/8/8914/CFM/8914/CFM 726 30/9/6855/CFM/6855/CFM 727 30/10/8914/CFM/8914/CFM 728 30/11/3070/CFM/3070/CFM////3070/CFM 729 30/12/180/CFM/180/CFM 730 30/13/0/CFM/1835/CFM 731 30/14/10028/CFM/10028/CFM 732 30/15/8914/CFM/8914/CFM 733 30/16/8914/CFM/8914/CFM 734 31/1/1/535/10//135/SINE-FIT/80/50 735 31/1/2/656/12//135/SINE-FIT/80/50 736 31/4/1/279/12//135/SINE-FIT/80/50 737 31/13/1/136/12//135/SINE-FIT/80/50 738 SYSTEM - 4 739 39/4/HEAT RECOVERY 740 40/1/TRH/ROADK 741 41/1/1/1/4/4 742 42/1/3/3/.65 743 44/1//////60//CLG-HTG//RM-EXH 744 45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF 745 40/2/SZ 746 41/2/2/2/11/11 747 42/2///.75//.75 748 44/2 749 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF 750 40/3/INDFP 41/3/3/3/5/5/7/7/9/9/12/12 751 752 42/3/8/8/1 753 44/3//////60//CLG-HTG//RM-EXH

45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG

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CONTENTS OF : C:\JOBS\CB122B.TM
LINE # -----
 755
       40/4/UH
 756
       41/4/13/13
       42/4/.20
 757
 758
       44/4
 759
       45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
 760
       40/5/DD
 761
       41/5/6/6/8/8/10/10
 762
       42/5/8/8/1
       44/5//////60//CLG-HTG//RM-EXH
 763
 764
       45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADKTG/CBADKTG/OFF/CBADFAN/OFF
 765
       40/6/DD
 766
       41/6/14/16
 767
       42/6/8/8/1
 768
       45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
 769
       EQUIPMENT - 4
       59/4/CARLISLE///HEAT RECOVERY
 770
       60/1/1/BLKPLANT/1/1/3/3/5/6
 771
 772
       60/2/2/BLKPLANT/2/2
 773
       62/1/EQ1001S/2/306/TONS
 774
       62/2/EQ1000
 775
       63/1/30/HP/30/HP////1
 776
       65/1/1//1/1/3/3/5/6
 777
       65/2/2//1/1/3/6
 778
       65/3/3//2/2
 779
       66/1//1
 780
       66/2/2//2
 781
       67/1/EQ2101/1/30/HP/11874/MBH/2156/KW
 782
       67/2/EQ2101/1/25/HP/2620/MBH/2300/KW
 783
       67/3/EQ2000
 784
       69/1/EQ4003//EQ4003
 785
       69/2/////EQ4003
 786
       69/3/EQ4003//EQ4003
 787
       69/4
       69/5/EQ4003//EQ4003
 788
789
       69/6/EQ4003//EQ4003
       74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT
```

```
CONTENTS OF : E:\CB122C.TM
LINE
   1
      JOB - 1
   2
       01/ENERGY SAVINGS OPPORTUNITY STUDY
   3
       01/CARLISLE BARRACKS, PA
   4
       01/DEPARTMENT OF THE ARMY
  5
       01/BENATEC ASSOCIATES
  6
       01/BUILDING 122
  7
       08/CARLISLE
  8
       09/MAY/SEP////APR/OCT
  9
       10/CLTD-CLF
 10
       11///ZONE
 11
       LOAD - 1
       19/1/COMBINED ECOS
 12
 13
       20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10
 14
       20/2/2/TOILETS, KITCHEN/1/3520/4/2//11
 15
      20/3/3/STAIRS/1/560/4/0//11
 16
       20/4/4/BSMT E/1/12424/4/3.3//12.7
 17
      -20/5/5/1ST FL OFFICES/1/11724/4/1.3//12
 18
       20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12
 19
       20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7
 20
       20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7
 21
       20/9/9/3RD FL OFFICES/1/14400/4/1.3//11
 22
       20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11
 23
      20/11/11/TOILETS W ROOF/1/580/4/2//11
 24
       20/12/12/STAIRS W ROOF/1/280/4/0//11
 25
       20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7
 26
       20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12
 27
       20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7
 28
      20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11
 29
       21/M///CBADCTX///CBADHTX
 30
       22/9/1/YES////14
 31
       22/10/1/YES////14
 32
       22/11/1/YES////14
 33
       22/12/1/YES////14
 34
       22/16/1/YES////14
 35
       24/2/1/9/10.3//134/45
 36
      24/2/2/10/10.3//134/315
 37
       24/3/1/16/11//135/45
 38
       24/3/2/48/11//135/135
 39
       24/3/3/16/11//135/225
 40
       24/5/1/108/11.3//134/45
 41
      24/5/2/281/11.3//134/135
 42
      24/5/3/93/11.3//134/225
 43
      24/5/4/235/11.3//134/315
 44
      24/6/1/9/11.3//134/45
 45
      24/6/2/27/11.3//134/135
 46
      24/6/3/22/11.3//134/225
 47
      24/6/4/56/11.3//134/315
 48
      24/7/1/135/10//134/45
 49
      24/7/2/320/10//134/135
 50
      24/7/3/135/10//134/225
 51
      24/7/4/344/10//134/315
 52
      24/8/1/8/10//134/135
 53
      24/8/2/8/10//134/315
 54
      24/9/1/135/10.3//134/45
 55
      24/9/2/320/10.3//134/135
 56
      24/9/3/135/10.3//134/225
 57
      24/9/4/344/10.3//134/315
 58
      24/10/1/8/10.3//134/135
```

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CONTENTS OF : E:\CB122C.TM
LINE
 59
       24/10/2/8/10.3//134/315
  60
       24/12/1/8/10.3//135/45
  61
       24/12/2/24/10.3//135/135
  62
       24/12/3/8/10.3//135/225
 63
       24/14/1/9/11.3//134/45
  64
       24/14/2/27/11.3//134/135
 65
       24/14/3/22/11.3//134/225
  66
       24/14/4/56/11.3//134/315
 67
       24/15/1/8/10//134/135
 68
       24/15/2/8/10//134/315
 69
       24/16/1/8/10.3//134/135
 70
       24/16/2/8/10.3//134/315
 71
       25/2/1/8.5/2.5/1/.55/.29
 72
       25/3/1/8.5/2.5/6/.55/.29
 73
       25/3/3/8.5/2.5/6/.55/.29
 74
       25/5/1/8.5/2.5/5/.55/.29
 75
       25/5/2/8.5/2.5/35/.55/.29
 76
       25/5/3/8.5/2.5/6/.55/.29
 77
       25/5/4/8.5/2.5/28/.55/.29
 78
       25/6/1/8.5/2.5/5/.55/.29
       25/6/2/8.5/2.5/7/.55/.29
 79
 80
       25/7/1/7/2.5/6/.55/.29
 81
       25/7/2/7/2.5/40/.55/.29
 82
       25/7/3/7/2.5/6/.55/.29
 83
       25/7/4/7/2.5/40/.55/.29
 84
       25/8/1/7/2.5/3/.55/.29
 85
      25/8/2/7/2.5/3/.55/.29
 86
       25/9/1/7/2.5/6/.55/.29
 87
      25/9/2/7/2.5/40/.55/.29
 88
       25/9/3/7/2.5/6/.55/.29
 89
      25/9/4/7/2.5/40/.55/.29
       25/10/1/7/2.5/3/.55/.29
 90
 91
      25/10/2/7/2.5/3/.55/.29
 92
       25/12/1/7/2.5/3/.55/.29
 93
       25/12/3/7/2.5/3/.55/.29
 94
      25/14/1/8.5/2.5/5/.55/.29
 95
      25/14/2/8.5/2.5/7/.55/.29
 96
      25/15/1/7/2.5/3/.55/.29
 97
      25/15/2/7/2.5/3/.55/.29
 98
      25/16/1/7/2.5/3/.55/.29
 99
      25/16/2/7/2.5/3/.55/.29
      26/1/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF
100
      26/2/CBADP&L/CBADP&L/OFF/AVAIL/CBADFAN/OFF/OFF/OFF/CBADFAN/OFF
101
      26/3/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
102
      26/4/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF
103
       26/5/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
104
      26/6/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
105
      26/7/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
106
      26/8/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
107
      26/9/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
108
      26/10/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
109
      26/11/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/CBADFAN/OFF
110
      26/12/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
111
      26/13/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF
112
      26/14/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
113
114
      26/15/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
      26/16/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF
115
116
      27/M/420/SF-PERS/255/255/1.66/WATT-SF/ASHRAE2
```

```
CONTENTS OF : E:\CB122C.TM
LINE #
117
       29/1/30/PCT-MCLG/30/PCT-MHTG/0//0
118
       29/2/0/PCT-MCLG/0/PCT-MHTG/0//0
119
       29/3/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
120
       29/4/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
121
       29/5/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
122
       29/6/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF/50/PCT-MCLG
123
      29/7/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
124
      29/8/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF/50/PCT-MCLG
125
      29/9/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
126
      29/10/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF/50/PCT-MCLG
127
      29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF
128
      29/12/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
129
      29/13/0/PCT-MCLG/0/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
130
      29/14/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
      29/15/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
131
      29/16/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
132
133
      30/1/23725/CFM/23725/CFM
      30/2/0/CFM/0/CFM////14660/CFM
134
135
      30/3/360/CFM/360/CFM
136
      30/4/12450/CFM/12450/CFM
137
      30/5/5505/CFM/5505/CFM
138
      30/6/10028/CFM/10028/CFM
139
      30/7/6535/CFM/6535/CFM
140
      30/8/8914/CFM/8914/CFM
141
      30/9/6855/CFM/6855/CFM
142
      30/10/8914/CFM/8914/CFM
143
      30/11/0/CFM/0/CFM////3070/CFM
144
      30/12/180/CFM/180/CFM
145
      30/13/0/CFM/1835/CFM
146
      30/14/10028/CFM/10028/CFM
147
      30/15/8914/CFM/8914/CFM
148
      30/16/8914/CFM/8914/CFM
149
      31/1/1/535/10//135/SINE-FIT/80/50
150
      31/1/2/656/12//135/SINE-FIT/80/50
151
      31/4/1/279/12//135/SINE-FIT/80/50
152
      31/13/1/136/12//135/SINE-FIT/80/50
153
      SYSTEM - 1
154
      39/1/COMBINED ECOS
155
      40/1/TRH/ROADK
156
      41/1/1/1/4/4
      42/1/3/3/.65
157
158
      44/1//////60//CLG-HTG//RM-EXH
      45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF
159
160
      40/2/SZ
161
      41/2/2/2/11/11
162
      42/2///.75//.75
163
      44/2
      45/2/0FF/0FF/0FF/0FF/0FF/0FF/0FF/0FF/0FF
164
165
      40/3/INDFP
166
      41/3/3/3/5/5/7/7/9/9/12/12
167
      42/3/8/8/1
168
      44/3//////60//CLG-HTG//RM-EXH
      45/3/CBADCLG/CBADCLG/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG
169
170
      40/4/UH
171
      41/4/13/13
172
      42/4/.20
173
      44/4
174
      45/4/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF
```

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CONTENTS OF : E:\CB122C.TM
LINE #
175
       40/5/DD
176
       41/5/6/6/8/8/10/10
177
       42/5/8/8/1
178
       44/5//////60//CLG-HTG//RM-EXH
179
       45/5/CBADCLG/CBADCLG/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
180
       40/6/DD
181
       41/6/14/16
182
       42/6/8/8/1
183
      45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
184
       EQUIPMENT - 1
185
      59/1/CARLISLE///COMBINED ECOS
186
      60/1/1/BLKPLANT/1/1/3/3/5/6
187
      60/2/2/BLKPLANT/2/2
188
      62/1/EQ1001S/2/306/TONS
189
      62/2/EQ1000
190 63/1/30/HP/30/HP////1
191
      65/1/1//1/1/3/3/5/6
192
       65/2/2//1/1/3/6
193
       65/3/3//2/2
194
       66/1//1
      66/2/2//2
195
      67/1/EQ2101/1/30/HP/11874/MBH/2156/KW
196
      67/2/EQ2101/1/25/HP/2620/MBH/2300/KW
197
198
      67/3/EQ2000
199
      69/1/EQ4003//EQ4003
200
      69/2/////EQ4003
201
      69/3/EQ4003//EQ4003
202
      69/4
203
      69/5/EQ4003//EQ4003
204
     .69/6/EQ4003//EQ4003
      74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT
2.05
```

Building 122
Trace Output File

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 122

Winter Ground Relectance:

Weather File Code: CARLISLE Location: ENERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) Summer Design Wet Bulb: 72 (F) Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: 0.20

0.20

Air Density:

Air Specific Heat:

Density-Specific Heat Prod:

1.0882 (Btu-min./hr/cuft/F)

1.0882 (Btu-min./hr/cuft/F)

Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 8:18:43 2/2/94
Dataset Name: CB122 .TM

AIRFLOW - ALTERNATIVE 1
BASE BUILDING

------ S Y S T E M S U M M A R Y ------ S Y S T E M S U M M A R Y ------ (Design Airflow Quantities)

System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Main Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
1	TRH	10,853	36,175	36,175	36,175	10,853	٥	0
	SZ	0	17,730	17,730	17,730	0	0	17,730
3	INDFP	5,830	19,435	19,435	36,448	19,435	37,165	0
4	UH	0	0	1,835	. 0	0	0	0
5	DD	8,357	27,856	27,856	- <b>28,</b> 824	27,856	0	0
6	DD	8,357	27,856	27,856	28,824	9,325	0	0
Totals		33,397	129,052	130,887	148,000	67,468	37,165	17,730

CAPACITY - ALTERNATIVE 1 BASE BUILDING

Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Heating Reheat Humidif. Opt. Vent System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) 1 TRH 81.5 0.0 0.0 81.5 -68,182 0 -480,162 0 -548,345 2 SZ 3.2 0.0 3.2 -9,837 0 -106,277 0.0 0 0 0 -9,837 0 3 INDFP 0 0 46.4 102.4 0.0 148.8 -680,963 -1,230,942 0 -1,911,905 -6,715 0 4 UH 0.0 0.0 0.0 0.0 0 0 0 0 -6,715 5 DD 63.1 0.0 0.0 63.1 -457,597 0 -365,035 0 0 0 -822,632 6 DD 63.1 0.0 -245,454 0 -365,035 0 0.0 63.1 0 0 -610,489 Totals 257.3 102.4 0.0 359.7 -1,468,749 -1,230,942 -1,316,509 0 0 -3,909,922

The building peaked at hour 14 month 7 with a capacity of 257.3 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

------ENGINEERING CHECKS-----

			Percent		Coo	ling		Heat	ing	
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	8tuh/	Cfm/	8tuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	TRH	30.00	0.63	443.7	705.9	17.00	0.63	-9.53	57,549
2	Main	SI	0.00	4.32	5,605.2	1,296.2	9.26	4.32	-2.40	4,100
3	Main	INDFP	30.00	0.47	418.7	891.2	13.46	0.47	-16.46	41,364
3	Auxiliary	INDFP	0.00	0.90	363.0	404.1	29.70	0.90	-29.76	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	441.4	429.7	27.92	1.03	-30.33	27,121
6	Main .	DD	30.00	1.03	_441.4	429.7	27.92	1.03	-22.51	27,121

Trane Air Conditioning Economics

By: Trane Customer Direct Service Network

System 1 Peak TRH - TERMINAL REHEAT

Peaked at T			Mo/Hr:				*		Hr:	•		Mo/Hr:	13/ 1	
Outside Air	::>	DAC	B/WB/HR:	91/ 74/105.0	)		*	0.4	ADB:	91 *		OADB:	4	
* 1		0	Dat Ain	Dat Ain	il a	• Dawa		· -		* *	0 D	l. 0-:3	n a le	
· .	Ça	Space ns.+Lat.	Sensible	Ret. Air Latent		t Perci l Of To		Sensi	ace	Percnt * Of Tot *			Peak Sens	Percnt Of Tot
Envelope Lo		(8tuh)	(Btuh)		(Btuh)		)		tuh)	(%) *	•		Stuh)	(%)
Skylite S		(oran)	(6641)	• •			0) *	(0)	0	0.00 *	•	0	0	0.00
Skylite C		Ŏ	, 0		•		00 *		0	0.00 *		0	n n	0.00
Roof Cond	Jilu	0	. 0				)0 *		0	0.00 *		٨	n	0.00
Glass Sol	ar	0	0				00 *		0	0.00 *		0	0	0.00
Glass Con		0	0				00 *		0	0.00 *		0	0	0.00
Wall Cond	4	0	0		'-		00 *		0	0.00 *		0	0	0.00
Partition		18,940	•		18,940		)4 *	18	940	4.00 *		182 -6	8,182	100.00
Exposed F		0					00 *	10,	0	0.00 *		0	0	0.00
Infiltrat		0			•		00 *		0	0.00 *		0	0	0.00
Sub Total		18,940	0	ı	18,940		94 *	18	,940			•	8,182	100.00
Internal Lo		10,710	•		10,71		*	10,	, , , , ,	*	•	101	0,101	100.00
Lights		398,781	0	ı	398,78	1 40.	76 *	424.	,020	89.45 *		0	0	0.00
People		63,941	•		63,941		54 *			6.56 *		0	Ō	0.00
Misc		0	0	0	(		)0 *	,	0	0.00 *		0	0	0.00
Sub Total:	::>	462,722	0		462,722		30 *	455.	,117			0	0	0.00
Ceiling Load		0	0	-			)() *	,	0	0.00 *		0	0	0.00
Outside Air		0	0	0	406,913		59 *		0	0.00 *		0	0	0.00
Sup. Fan He					77,173		39 *			0.00 *			0	0.00
Ret. Fan Hea			18,007		18,00		34 *			0.00 *			0	0.00
Duct Heat Pl			. 0		, (		00 *			0.00 *			0	0.00
OV/UNDR Siz		0					00 *		0	-0.00 *		0	0	0.00
Exhaust Hea	-		-5,402	. 0	-5,402	2 -0.:	55 *			0.00 *			0	0.00
Terminal By	pass		0	0			)0 *			0.00 *			0	0.00
							*			*				
Grand Total	::>	481,661	12,605	0	978,35	3 100.0	)0 *	474,	,057	100.00 *	-68,	182 -6	8,182	100.00
AN A														
				LING COIL SE							•	AREAS		
	Fotal C	apacity	Sens Cap.	Coil Airfl	Enter	ing DB/N	VB/HR	Leav	∕ing D	8/WB/HR	Gross To	tal Gl	ass (st	(%)
	Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De	eg F G	rains	Deg F	Deg F	Grains	Floor	57,549		
Main Clg-	81.5	978.4	719.6	36,175	80.0	67.5	83.9	61.0	59.3	74.8		16,570		
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		ExFlr	0		
	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	0		0 (
Totals	81.5	978.4									Wall	0		0 (
C								•						
	HEATING	COIL SELE	CTION		A					ENGINEERING		TEMPE		
				- 0	Type	Cooli	-	Heating		g % OA	30.0	Туре	Clg	-
r, '	(Mbh)	(cfa	-	-	Vent	10,8		0		g Cfm/Sqft		SADB	63.0	
	-68.2				Infil			0		g Cfm/Ton		Plenum	75.0	
	0.0				Supply	36,1		36,175		g Sqft/Ton		Return	75.5	
Preheat	-480.2	_			Mincfm	36,1		0		g Btuh/Sqft		Ret/OA	80.0	
	-0.0		0 0.0		Return	36,1		36,175		. People		Runarnd		
	0.0		0 0.0		Exhaust	10,8		0		.g % OA		Fn MtrT		
Opt Vent	0.0		0 0.0	0.0	Rm Exh		0	0	Ht	g Cfm/SqFt	0.63	Fn BldT	D 0.4	1 0.4
Total	-548.3				Auxil					g Btuh/SqFt	-9.53	Fn Fric	t 1.1	1

	la be														•	
	System	2	Peak	SI	- SINGLE	ZONE										
	******	******	***** C(	OOLING COIL		******	****	*******	*****	CLG SP	ACE	PEAK ****	***** HE	ATING COIL	PEAK	******
	.31	at Time =		Mo/Hr: 7				*	<b>k</b>	Mo/Hr	: 7	/16 *		Mo/Hr:	13/ 1	
	Outside	Air ==>	OAI	D8/W8/HR: 9	1/ 73/ 98.	.0		*	ķ	OADB	: 9	1 *		OAD8:	4	
	e de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición dela composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición dela composición de la composición de la composición dela composición dela composición de la composición de la composición de la composición de la composición de la composición de la composic							*	k			*				•
11.42	4 .		Space		Ret. Air	İ	Net 1	Peront <sup>1</sup>	<b>t</b>	Space	е	Percnt *	Space P	eak Coil	Peak	Percnt
			Sens.+Lat.	Sensibl <b>e</b>	Latent	To	tal (	Of Tot *	k 5	Sensible	е	Of Tot *	Space S	ens Tot	Sens	Of Tot
	Envelope		(Btuh)	(Btuh)	(Btuh)	(Bt	uh)	(%)	ķ	(Btuh)	)	(%) *	(8t	uh) (	(Btuh)	(%)
7	Skylit	e Solr	0	0			0	0.00	ķ .	(	0	0.00 *		0	0	0.00
		te Cond	0	. 0			0	0.00	ķ	(	0	0.00 *		0	0	0.00
	Roof		0	860		1	360	2.26		(	0	0.00 *		0 -	3,224	44.57
	Glass		595	0			595	1.57	ţ	595	5	1.71 *		0	0	0.00
	Glass		239	0		1	239	0.63		239	9	0.69 *	-1,	139 -	1,139	15.75
	Wall (		747	183		•	929	2.45		747	7	2.14 *	-2,	286 -	2,870	39.68
	Partit		0			-	0	0.00		(	0	0.00 *		0	0	0.00
strill in	•	ed Floor	0				0	0.00		(	0	0.00 *		0	0	0.00
		ration	0				0	0.00			0	0.00 *		0	0	0.00
-		tal==>	1,581	1,042		2,	523	6.91	k	1,58	1	4.54 *	-3,	426 -	7,234	100.00
	Internal							*	ť			*				
	Lights		30,623	. 0		30,		80.68		30,623		87.96 *		0	0	0.00
	People	)	4,712	Ā		4,		12.41		2,223		6.38 *		0	0	0.00
	Misc	4-1	0	0	0	7.	0	0.00 3			0	0.00 *		0	0	0.00
		tal==>	35,335	1 010	0	35,	_	93.09 *		32,845		94.34 *		0	0	0.00
	Ceiling Outside		1,918 0	-1,918 0	^		0	0.00		389	-	1.12 *		243	0	0.00
	Sup. Fan		U	U	0		٨	0.00 3		(	0	0.00 * 0.00 *		0	0	0.00
_	Ret. Fan			٨			٨	0.00				0.00 *			0	0.00
	Duct Hea			0			٨	0.00				0.00 *			٥	0.00
	OV/UNDR		0	V			Λ	-0.00 *			)	-0.00 *		0	۸	-0.00
	Exhaust	_	•	0	0		٨	0.00		`		0.00 *		V	۸	0.00
	Terminal			0	0		0	0.00 *				0.00 *			0	0.00
·	, - , ,	-//		•	·		•	1				*			v	0.00
	Grand To	tal==>	38,834	-876	0	37.9	758 I	100.00	•	34,815	5	100.00 *	-3.	668 -	7,234	100.00
	Žijos		,			,				,			-,		,	
				COOL	ING COIL S	ELECTION.								AREAS	}	
	મોટી ક્ષેપ્ટ જોડો ક્ષેપ્ટ	Total	Capacity	Sens Cap.	Coil Airfl	Ente	ering	DB/WB/HF	}	Leaving	g DB,	/WB/HR	Gross To	tal Gl	ass (s	f) (%)
		(Tons)		(Mbh)	(cfm)	Deg F	Deg F	F Grains	. Deg	F Deg	g F	Grains	Floor	4,100		
2 2 2	Main Clg-			35.5	17,730	76.6	68.9	96.8			3.3	99.1	Part	0		
* * * * * * * * * * * * * * * * * * *	Aux Clg	0.0		0.0	0	0.0	0.0				0.0	0.0	ExFlr	0		
	Opt Vent	0.0		0.0	0	0.0	0.0	0.0	) 0	).0 (	0.0	0.0	Roof	580		0 0
	Totals	3.2	38.0										Wall	196		21 11
300		HEATT	UA AAT! AC!						,		_					- (-)
	9			ECTION				LOWS (cfm				NGINEERING				s (F)
			ty Coil Ai		Lvg	Type	U	ooling	Heati	-	_	% OA	0.0	Type	Clg	
	Main Uta	(Mbh	•	-	Deg F	Vent		0			_	Cfm/Sqft	4.32	SADB	73.	
	Main Htg	-9 0			68.2	Infil		0 770	17			Cfm/Ton	5605.16	Plenum	76.	
	Aux Htg Brebest	-106		0.0	0.0	Supply	J	17,730	17,		-	Sqft/Ton		Return	79.	
	Preheat Reheat		.3 17,7 .0	730 67.7 0 0.0	73.2	Mincfm		0	17,		_	Btuh/Sqft People	10	Ret/OA	76. 1 75.	
	keneat Humidif	0		0.0	0.0 0.0	Return		0	17,			% OA	0.0	Runarno Fn Mtr1		
	oumidii Opt Vent	0		0 0.0	0.0	Exhaust Rm Exh	1	17,730				Cfm/SqFt	4.32	Fn BldT		
	Total	-9		v v.v	0.0	Auxil	1	0			-	Btuh/SqFt		Fn Fric		
	. 2001	,				HUALI		J		v		Journ Judi P	4.TV	111 1111	, , V.	· · · · ·

System 3 Block INDFP - 4-PIPE INDUCTION

Peaked	at Time =	::>	COOLING COIL Mo/Hr:	7/14			* Mo	/Hr:	7/19 *		ING COIL Mo/Hr: 1		*****
Outside	: Air ==>	0,4	ADB/W8/HR: 4	91/ 74/105.	0		* 0 *	ADB:	85 *		OADB:	4 .	
		Space	Ret. Air	Ret. Air	Net	Percnt	* 5	pace	Percnt *	Space Pea	k Coil	<sup>p</sup> eak	Percnt
		Sens.+Lat.	Sensible	Latent	Total	Of Tot	* Sens	ible	Of Tot *	Space Ser	s Tot	Sens	Of Tot
Envelop	e Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	* (B	tuh)	(%) *	(Btul	) (B	tuh)	(%)
-	te Solr	0	0		0	0.00	*	0	0.00 *			0	0.00
•	te Cond	0	. 0		0	0.00	*	0	0.00 *		0	0	0.00
Roof	Cond	474	21,484		21,957	1.22	*	664	0.10 *	-1,57	9 -73	446	3.84
		171,927	0		171,927	9.54	* 185	,822	27.51 *		0	0	0.00
Glass		53,830	0		53,830	2.99	* 40	,082	5.93 *	-276,28	7 -276	,287	14.45
Wall (		113,330	16,902		130,232	7.22	<b>*</b> 168	,977	25.01 *	-328,40			.19.74
Parti	tion	0			- 0	0.00	*	0	0.00 *		0	0	0.00
Expose	ed Floor	0			0	0.00	*	0	0.00 *		0	0	0.00
Infil	tration	736,354			736,354	40.85	<b>*</b> 170	,578	25.25 *	-1,184,85	2 -1,184	852	
Sub To	otal==>	1,075,915	38,386		1,114,301	61.81		,123			5 -1,911		100.00
Internal	l Loads						*	•	*		-,		
Lights	S	277,628	0		277,628	15.40	<b>*</b> 79	,744	11.80 *		0	0	0.00
People	е	45,248			45,248			•	0.90 *		0	0	0.00
Misc		0	0	0	0	0.00		0	0.00 *		0	0	0.00
Sub To	otal==>	322,876	0	0	322,876			,814	12.70 *		0	Ô	0.00
Ceiling	Load	14,654	-14,654		. 0			,486	3.48 *		1	Ô	0.00
Outside	Air	0	0	0	252,361			Ô	0.00 *	•	0	0	0.00
Sup. Fai	n Heat				110,564				0.00 *			0	0.00
Ret. Far	n Heat		13,820		13,820				0.00 *			0	0.00
Duct Hea	at Pkup		0		, 0				0.00 *			0	0.00
OV/UNDR	Sizing	119			119			119	0.02 *		0	0	0.00
Exhaust	Heat		-11,266	0	-11,266				0.00 *			0	0.00
Terminal	l Bypass		0	0	0				0.00 *			0	0.00
						:	*		*				
Grand To	otal==>	1,413,564	26,287	0	1,802,776	100.00	675	,542	100.00 *	-1,838,93	6 -1,911,	905	100.00
	n 1 35 Japan		cool	ING COIL S	ELECTION						AREAS		
	Total	Capacity	Sens Cap.			ng D8/WB/H	R Leav	∕ing D	B/WB/HR	Gross Tota	l Glas	s (sf)	(%)
	(Tons)		(Mbh)	•	•	g F Grains		Deg F	Grains	Floor 4	1,364		
Main Clg-			402.9	19,435		6.7 78.0	59.9	57.7	69.7	Part	0		
Aux Clg			771.3	37,165	75.0 6	4.2 74.9	9 65.1	53.2	42.8	ExFlr	0		
Opt Vent		0.0	0.0	0	0.0	0.0 0.0	0.0	0.0	0.0	Roof 1	4,680		0 0
Totals	148.8	1,785.4									8,354		2 18
			ECTION			RFLOWS (cfr	n)		ENGINEERING	CHECKS	TEMPERA	TURES	(F)
			irfl Ent		Type	Cooling	Heating	Cl	g % OA		Type	Clg	Htg
	(Mbh	) (cf	m) Deg F	Deg F	Vent	5,830	0	Cl	g Cfm/Sqft		SADB	65.1	96.7
Main Htg	-681	.0 19, .9 37,	435 64.5	96.7	Vent Infil	17,013	17,013	Cl	g Cfm/Ton	418.73	Plenum	76.1	64.4
Aux Htg	-1,230	.9 37,	165 68.0	98.5	Supply	19,435	19,435	C1	g Sqft/Ton		Return	76.8	64.5
Preheat	-0	.0 19,	435 64.5	59.9		0	0	C1	g Btuh/Sqft		Ret/OA	80.9	64.5
Reheat	0	.0	0.0	0.0			19,435		. People	98	Runarnd	75.0	68.0
Humidif	0	.0 .0 .0	0.0	0.0	Exhaust	5,830	0	Ht	g % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent			0.0	0.0	Rm Exh	0	0	Нt	g Cfm/SqFt	0.47	Fn BldTD	1.0	1.0
Total	-1,911				Auxil	37,165	37,165		g Btuh/SqFt		Fn Frict	2.9	2.9
							•		- , .				

System 4 Block UH - UNIT HEATERS

and was a														1.	i, di,
****	********	******	COOLING CO	IL PEAK *:	*****	******	*****	*****	**** CLG	SPACE	PEAK ****	***** HE	ATING COIL	PEAK *	******
	d at Time		Mo/Hr:					*		/Hr: (			Mo/Hr:		
Outsi	de Air ==>	0	ADB/WB/HR:	0/ 0/	0.0			*		ADB:	0 *		OAD8:		
				. ,				*			*			-	2.75
A CONTRACT		Space	Ret. Ai	ir Ret.	Air	Ne:	t Per	cnt *	. S	pace	Percnt *	Space P	eak Coil	Peak	Percnt
•		Sens.+Lat.				Total			Sens	•	Of Tot *			Sens	Of Tot
Envelo	ope Loads	(Btuh)				(Btuh		(%) *		tuh)	(%) *	•		Btuh)	(%)
	lite Solr	0	•	0	,			.00 *	(5	0	0.00 *	-	0	0	0.00
-	lite Cond	0		0		ì		.00 *		n	0.00 *		Λ .	0	0.00
-	f Cond	0		0		·		.00 *		0	0.00 *		٨	0	0.00
	ss Solar	0		0				.00 *		0	0.00 *		٨	0	0.00
	ss Cond	0		ň				.00 *		٨	0.00 *		٨	٥	0.00
	l Cond	0		Λ.				.00 *		۸	0.00 *		٨	0	
	tition	0						.00 *		0	0.00 *		715 -		0.00
	osed Floor	0						.00 *		0	0.00 *	•		6,715	100.00
	iltration	٥						.00 *		٥			0	0	0.00
	Total:=>	0		0						0	0.00 *		0	0	0.00
	nal Loads	V		U		,	<i>1</i> 0	* 00.		0	0.00 *	•	/15 -	6,715	100.00
		^		۸		,		^^ *		۸	*		٥	•	,
Ligh		0		0		,		.00 *		0	0.00 *		0	0	0.00
Peor		0		۸	۸	(		.00 *		0	0.00 *		0	0	0.00
Misc		0		0	0	(		.00 *		0	0.00 *		0	0	0.00
	Total==>	U		0	0	(		.00 *		0	0.00 *		0	0	0.00
	ng Load	V		0	•	(		.00 *		0	0.00 *		0	0	0.00
	de Air	0		0	0	(		* 00.		0	0.00 *		0	0	0.00
	an Heat			٥				.00 *			0.00 *			0	0.00
	an Heat			0		(		.00 *			0.00 *			0	0.00
	Heat Pkup			0				.00 *		•	0.00 *		_	0	0.00
	R Sizing	0		•	•	(		.00 *		0	0.00 *		0	0	0.00
	st Heat			0	0			* 00.			0.00 *			0	0.00
iermin	nal Bypass			0	0	(	0	.00 *			0.00 *			0	0.00
0	T-4-1	^		۸	^	,		*			* * * * * * * * * * * * * * * * * * * *				
Grand	Total:=>	0		0	0	(	) 0	.00 *		0	0.00 *	-6,	715 -	6,715	100.00
			٥	NO. THO. 00:	71 051	COTTON									
	T.4.1		C(										AREAS		
	and the second second	•	Sens Cap.									Gross To		ass (sf	) (%)
Main Ol	(Tons)		(Mbh)								Grains		2,544		
		-	0.0												
Aux C	-				0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
Opt Ver					U	0.0	0.0	0.0	0.0	0.0	0.0	Roof	0		0 0
Totals	0.0	0.0										Wall	0		0 0
	HEAT		LEATTON			۸,		0 (- (-)		_		AUFAKA			
24			LECTION					. ,			NGINEERING			RATURES	
	Capaci	-		_		Туре	Cool	-	Heating	-	) % OA	0.0	Type	Clg	Htg
M	(Mbl		fm) Deg	_		ent		0	0	_	Cfm/Sqft	0.00	SADB	0.0	
Main Ht	•		,835 68.			nfil		0	0	-	Cfm/Ton	0.00	Plenum	0.0	
. Aux Ht		).0	0 0.			upply		0	1,835	-	Sqft/Ton	0.00	Return	0.0	
Preheat		).0	0 0.			incfm		0	0		; Btuh/Sqft		Ret/OA	0.0	
Reheat		).0	0 0.			eturn		0	1,835		People	0	Runarno		
Humidit		).0	0 0.			xhaust		0	0		3 % OA	0.0	Fn Mtrl		
Opt Ver		0.0	0 0.	0.0		m Exh		0	0	_	; Cfm/SqFt	0.72	Fn 81d7		
Total	-6	5.7			A	uxil		0	0	Htg	ß Btuh/SqFt	-2.64	Fn Fric	t 0.1	0.0

System 5 Block DD - DOUBLE DUCT

*****	******	******* C	OOLING COIL	PEAK ****	******	********	***** CLG	SPACE	PEAK ****	***** HEA	TING COIL	PEAK *	*****
	t Time ==		Mo/Hr:					/Hr:			Mo/Hr: 13		
Outside	Air ==>	0A		91/ 74/105.	0			•			OADB:	4	•
			. , ,	., .,,			*		*		3,1,551	•	
		Space	Ret. Air	Ret. Air	Ne	t Percnt	* 5	pace	Percnt *	Space Pe	ak Coil f	Peak	Percnt
	S	ens.+Lat.	Sensible			l Of Tot		ible		,			Of Tot
Envelope		(Btuh)	(Btuh)		(Btuh			tuh)	(%) *				(%)
	e Solr	Ó	0		•	0.00	•	0	0.00 *	-	0	0	0.00
-	e Cond		0			0.00		0	0.00 *		0	. 0	0.00
Roof C		14,486	0		14,486			,221			86 <b>-48</b> ,	-	21.28
Glass		17,909	0		17,90			,285		,	0	0	0.00
Glass		4,840	0		4,840			,167			90 <b>-24</b> ,	-	10.88
Wall C		4,161	526		4,68				1.99 *		77 <b>-</b> 18,		8.34
Partit		0			1 -	0.00		0	0.00 *	•	0		0.00
	d Floor				·	0.00		0	0.00 *			. 0	0.00
					33,323			,324			03 -67,		29.70
			526		75,24			,619		•			70.19
Internal		, 1, , 2	310		73,24.	, ,,,,	. J,	,017	Z1.14 **	•	JU -1J7,	300	70.17
Lights		190,447	0		190,44	7 25.15	* 200	670	71.22 *		0	0	0.00
People		30,203	v		30,203			,612	5.18 *		0	0	
` Misc		0,200	0	0		0.00		, 012	0.00 *		0	٨	0.00
	tal==>	-	0	-	220,650			•	76.40 *		^	۷	0.00
			-1,375	-		0.00		,553	0.55 *		יט דר	۸	0.00
Outside		0			287,738			, , , , ,	0.00 *	•	0	۸	
Sup. Fan		V	V	V	158,470			v	0.00 *		U	٨	0.00
Ret. Fan			19,809		19,809				0.00 *			۸	0.00
Duct Hea			17,007			0.00			0.00 *			۸	0.00
OV/UNDR		5,366	V			0.71		,366	1.90 *		48 -67,	440	
Exhaust	-	3,000	-9,934	0	-9,934			, 500	0.00 *		+0 -07,	-	29.81
Terminal			7,754		7,755				0.00 *			0	0.00
75, 111,101	o, pass		v	v		0.00	*		V.0V #			V	0.00
Grand In	tal==>	302 110	9,026	٥	757 343	100.00	<b>*</b> 281	,990			71	040	100.00
		001,110	,,,,,,	•	737,070		101	, , , , ,	100.00	227,0	JI -220,	740	100.00
			C00I	LING COIL SE	LECTION						AREAS		
	Total C			Coil Airfl					8/W8/HR				) (%)
	(Tons)		(Mbh)			eg F Grain			Grains		27,121	J (J.	/ (°/
Main Clg-	63.1	757.3	577.1	27,856			-			Part	0		
				0							0		
Opt Vent	0.0	0.0	0.0	0		0.0 0.		0.0		Roof	8,563		0 0
Totals	63.1	757.3			•					Wall	1,613	4	60 29
											· , - <del></del>	,	/
**********	HEATING	COIL SELE	ECTION		AI	RELOWS (of	m)		ENGINEERING	CHECKS	TEMPERA	TURES	(F)
	Capacity	Coil A	irfl Ent	Lvg	Type	Cooling	Heating		g % OA	30.0	Туре	Clg	Htg
	(Mbh)	(cfr			Vent	8,357	0		g Cfm/Sqft	1.03	SADB	65.7	
Main Htg	-457.6				Infil	968	968		g Cfm/Ton	441.37	Plenum	75.4	
Aux Htg	0.0		0.0		Supply	27,856	27,856		g Sqft/Ton	429.73	Return	76.1	
Preheat	-365.0				Mincfm	0	, 0		g Btuh/Saft	27.92	Ret/OA	80.4	
Reheat	0.0	•	0.0		Return	27,856	27,856		. People	65	Runarnd	75.0	
Humidif	0.0	;	0.0		Exhaust	8,357	0		g % OA	0.0	Fn MtrTD	1.3	
Opt Vent	0.0	+	0.0		Rm Exh	0	0		g Cfm/SqFt	1.03	Fn BldTD	1.0	
Total	-822.6	,			Auxil	0	0		g Btuh/SqFt	-30.33	Fn Frict	2.9	
									- ,			/	,

System 6 Block DD - DOUBLE DUCT

******	******	****** C	OOLING COIL	PEAK ****	******	******	****	**** CLG	SPACE	PEAK ****	***** HEAT	ING COIL P	EAK *	*****
Peaked a	t Time ==	>	Mo/Hr:				*		/Hr:			Mo/Hr: 13		
Outside	Air ==>	0A	DB/WB/HR:	91/ 74/105.	0		*	0	ADB:	91 *			4	* **
							*			*				-
		Space		Ret. Air		t Percr			pace	Percnt *	Space Pea	ak Coil P	eak	Percnt
		ens.+Lat.	Sensible		Tota			Sens	ible	Of Tot *	•	ns Tot S	ens	Of Tot
Envelope		(Btuh)	(8tuh)	(8tuh)	(Btuh	) (%	;) *	(8	tuh)	(%) *	(Btul	n) (Bt	uh)	(%)
Skylit		0	0		(	0.0	0 *		0	0.00 *	•	0	. 0	0.00
Skylit		0	. 0		(		10 *		0	0.00 *		0	0	0.00
Roof Co		14,486	0		14,486	6 1.9	1 *	16	,221	5.75 *	-48,28	36 -48,	286	21.28
Glass		17,909	0		17,90	9 2.3	6 *	16	, 285	5.78 *		0	0	0.00
Glass		4,840	0		4,840	0 0.6	4 *	5	,167	1.83 *	-24,69	0 -24,	690	10.88
Wall Co	ond	4,161	526		4,68	7 0.6	2 *	5	,622	1.99 *	-16,67	77 -18,	921	8.34
Partit:	ion	0			1 2 (	0.0	0 *		0	0.00 *		0	0	0.00
Expose	d Floor	0			(	0.0	0 *		0	0.00 *		0	0	0.00
Infilt	ration	33,323			33,323	3 4.4	0 *	16	, 324	5.79 *	-67,40	3 -67,	403	29.70
Sub To	tal==>	74,719	526		75,245	5 9.9	4 *		,619	21.14 *		-		70.19
Internal	Loads						*			*	•	•		
Lights		190,447	0		190,447	7 25.1	5 *	200	, 839	71.22 *		0	0	0.00
People		30,203			30,203		9 *	14.	,612	5.18 *		0	0	0.00
Misc		0	0	0	. (		0 *		0	0.00 *		0	0	0.00
Sub To	tal==>	220,650	0	0	220,650	29.1	3 *	215	,452	76.40 *		0	0	0.00
Ceiling	Load	1,375	-1,375		(		0 *		,553	0.55 *		27	0	0.00
Outside A	Air	0	0	0	287,738	37.9	9 *		0	0.00 *	,	0	0	0.00
Sup. Fan	Heat				158,470	0 20.9	2 *			0.00 *			0	0.00
Ret. Fan	Heat		19,809		19,809		2 *			0.00 *			0	0.00
Duct Hear	t Pkup		0		, (		0 *			0.00 *			0	0.00
OV/UNDR S	Sizing	5,366			5,366		1 *	5.	366	1.90 *		8 -67,	648	29.81
Exhaust 1	Heat		-9,934	0	-9,934		i *			0.00 *	,	·,	0	0.00
Terminal	Bypass		0	0			0 *			0.00 *		•	0	0.00
							*			*			-	
Grand Tot	tal==>	302,110	9,026	0	757,343	3 100.0	0 *	281,	990	100.00 *	-229,33	-226,	948	100.00
	•										,	,		
				ING COIL S								AREAS		
		Capacity	Sens Cap.	Coil Airfl	Enteri	ing DB/W	B/HR	Leav	ing D	B/WB/HR	Gross Tota	l Glas	s (sf)	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De	eg F Gr	ains	Deg F	Deg F	Grains	Floor 2	7,121		, ,
Main Clg-	63.1	757.3	577.1	27,856	80.4	88.3	87.0	60.5	60.1	79.2	Part	0		
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	8,563		0 0
Totals	63.1	757.3			•						Wall	1,613	46	0 29
								•						
***************************************			ECTION		AI	CRFLOWS	(cfm)		(	ENGINEERING	CHECKS	TEMPERA	TURES	(F)
	Capacity	Coil A	irfl Ent	Lvg	Type	Coolin	g	Heating	Cl	g % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfi	m) Deg F	Deg F	Vent	8,35	7	0	Clo	g Cfm/Sqft	1.03	SAD8	65.7	75.6
Main Htg	-245.5	•	856 67.5	75.6	Infil	96	8	968	Cl	g Cfm/Ton	441.37	Plenum	75.4	66.5
Aux Htg	0.0	)	0.0	0.0	Supply	27,85	6	27,856	Clq	g Sqft/Ton	429.73	Return	76.1	67.5
Preheat	-365.0		856 48.4	60.5	Mincfm		0	0	Clg	g Btuh/Sqft	27.92	Ret/OA	80.4	67.5
Reheat	0.0		0.0	0.0	Return	27,85	6	27,856	No.	. People	65	Runarnd	75.0	68.0
Humidif	0.0		0.0	0.0	Exhaust	8,35	7	0	Htg	g % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0		0.0	0.0	Rm Exh		0	0	Нtg	g Cfm/SqFt	1.03	Fn BldTD	1.0	1.0
Total	-610.5	5			Auxil		0	0	Htg	g Btuh/SqFt	-22.51	Fn Frict	2.9	2.9

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

----- 8 U I L D I N G U - V A L U E S -----

					Room	Room						
Doom				Cumm		/hr/sqf		612 - 4 -			Mass	Capac.
Room	5 <i>::</i>	0 4	E E3		Wintr			Wintr	••		(lb/	(Btu/
Number	Description	Part.	EXFIR	Skylt	Skylt	Koot	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000-	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System <sup>.</sup>	<pre>1 Total/Ave.</pre>	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	11 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	35.3	7.23
3		0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
Zone	<ol><li>3 Total/Ave.</li></ol>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
12	•	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
System	<pre>3 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	74.1	15.63
13		0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	13 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
8	-2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	.8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	<pre>14 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	<pre>15 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	<pre>16 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
Buildin	· ·	0.229	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	52.6	10.93

BUILDING AREAS - ALTERNATIVE 1

-----BUILDING AREAS-----

				Floor	Total		Exposed						
		Numbe	er of	Area/Dupl		Partition	Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room		Dupli	icate	Room	Area	Area	Area	Area		Area	Area	/Wl	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	SUB BSMT, BSMT W	1	1	45,125	45,125	13,222	0	0	0	0	0	0	0
Zone					45,125	13,222	0	0	0	0	0	0	0
	BSMT E		1	12,424	12,424	3,348	0	0	0	0	0	0	0
Zone	4 Total/Ave.			2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -	12,424	3,348	0	0	0	0	0	0.	0
System	1 Total/Ave.				57,549	16,570	0	0	0	0	0	0	0
	TOILETS, KITCHEN	1	1	3,520	3,520	0	0	0	0	0	21	11	174
Zone	• .				3,520	0	0	0	0	0	21	11	174
	TOILETS W ROOF	1	1	580	580	0	0	0	0	580	0	0	0
Zone					580	0	0	0	0	580	0	0	0
System	2 Total/Ave.				4,100	0	0	0	0	580	21	11	174
	STAIRS	1	1	560	560	0	0	0	0	0	255	29	625
Zone	3 Total/Ave.				560	0	0	0	0	0	255	29	625
	1ST FL OFFICES	1	1	11,724	11,724	0	0	0	0	0	1,573	19	6,530
Zone _	,,				11,724	0	0	0	0	0	1,573	19	6,530
_	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	0	0	1,610	17	7,730
Zone	7 Total/Ave.				14,400	0	0	0	0	0	1,610	17	7,730
	3RD FL OFFICES	1	1	14,400	14,400	0	0	0	0	14,400	1,610	17	8,010
Zone	9 Total/Ave.				14,400	0	0	0	0	14,400	1,610	17	8,010
	STAIRS W ROOF	1	1	280	280	0	0	0	0	280	105	25	307
Zone	•				280	0	0	0	0	280	105	25	307
System	3 Total/Ave.				41,364	0	0	0	0	14,680	5,152	18	23,202
A Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Comp	SUPPLY STORAGE	1	1	2,544	2,544	1,632	0	0	0	0	0	0	C
	13 Total/Ave.				2,544	1,632	0	0	0	0	0	0	C
System	4 Total/Ave.			0.00/	2,544	1,632	0	0	0	0	0	0	0
5.75	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	6 Total/Ave.			0 (7)	9,884	0	0	0	0	0	250	19	1,038
- 1 ±	-2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	55
Zone	8 Total/Ave.			0.5/7	8,674	0	0	0	0	0	105	66	<b>5</b> 5
*	3RD FL CEN OFFCS	1	1	8,563	8,563	0	. 0	0	0	8,563	105	64	60
Zone	10 Total/Ave.				8,563	0	0	0	0	8,563	105	64	60
System	5 Total/Ave.			0.007	27,121	0	0	0	0	8,563	460	29	1,153
14	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	14 Total/Ave.		,	0 (7)	9,884	0	0	0	0	0	250	19	1,038
15		1	i	8,674	8,674	0	0	0	0	0	105	66	_· , _ <b>5</b> 5
Zone	15 Total/Ave.				8,674	0	0	0	0	0	105	66	<b>5</b> 5
	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	16 Total/Ave.				8,563	0	0	0	0	8,563	105	64	60
System	6 Total/Ave.				27,121	0	0	0	0	8,563	460	29	1,153
Buildin	g				159,799	18,202	0	0	0	32,386	6,095	19	25,681

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ASHRAE 90 ANALYSIS - ALTERNATIVE 1 BASE BUILDING

----- ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 24.46 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

### System Totals

Percent	Cool	ing Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	18.0	0	0	-200,810	13	170	6,544.3	0	0	0.0	0	0
5 - 10	36.0	0	4	-401,620	10	129	13,088.7	0	0	0.0	0	0
10 - 15	54.0	9	94	-602,430	- 7	91	19,633.1	0	0	0.0	0	. 0
15 - 20	71.9	7	78	-803,240	3	34	26,177.4	0	0	0.0	0	0
20 - 25	89.9	9	92	-1,004,050	5	68	32,721.7	0	0	0.0	0	0
25 - 30	107.9	10	108	-1,204,860	5	59	39,266.1	0	0	0.0	0	0
30 - 35	125.9	8	90	-1,405,670	9	114	45,810.5	0	0	0.0	0	0
35 - 40	143.9	19	208	-1,606,480	27	346	52,354.8	0	0	0.0	0	0
40 - 45	161.9	3	34	-1,807,290	15	187	58,899.2	0	0	0.0	0	0
45 - 50	179.8	5	53	-2,008,100	7	90	65,443.5	0	0	0.0	0	0
50 - 55	197.8	6	67	-2,208,910	0	0	71,987.9	0	0	0.0	0	0
55 - 60	215.8	4	42	-2,409,720	0	0	78,532.2	0	0	0.0	0	0
60 - 65	233.8	3	3.5	-2,610,530	0	0	85,076.6	0	0	0.0	0	0
65 - 70	251.8	7	75	-2,811,340	0	0	91,620.9	0	0	0.0	0	0
70 - 75	269.8	7	75	-3,012,150	0	0	98,165.3	0	0	0.0	0	0
75 - 80	287.8	1	15	-3,212,960	0	0	104,709.6	0	0	0.0	0	0
80 - 85	305.7	0	0	-3,413,770	0	0	111,254.0	0	0	0.0	0	0
85 - 90	323.7	0	0	-3,614,580	0	0	117,798.3	100	2,520	0.0	0	0
90 - 95	341.7	0	0	-3,815,390	0	0	124,342.7	0	0	0.0	0	0
95 - 100	359.7	0	0	-4,016,200	0	0	130,887.0	0	0	0.0	0	0
Hours Off	0.0	0	7,690	0	0	7,472	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
BASE BUILDING

					RUI	l D T I	NG	TEM	PFR	ATU	REP	R O F	TIF	ς			
							., 4				N L 1	1 0 1	1 6 6	J			
Temperature										Zone N	umber ·						
Range	1	4	2	11	3	5	7	9	12	13	6	8	10	14	15	16	
<b>(</b> F)																•	
Max. Temp.	82.6	81.5	201.1	120.2	86.4	85.1	84.9	83.3	85.3	96.2	85.1	88.5	84.5	85.1	88.5	84.5	
Mo./Hr.			9 19		7 20					8 17	7 3		7 6	7 3	10 1	7 6	
Day Type	2	2	2	2	4	1	1	4	4	2	5	2	. 5		2	. 5	
													-		_	_	
							, .		Nu	nber o	f Hours	5	<i>.</i>				
Above 100	0	0	8,016	4,086	0	0	- 0	0	0	0	0	0	0	0	0	0	
95 - 100	0	0	0	110	0	0	0	0	0	240	0	0	0	0	0	0	
90 - 95	0	0	91	1,239	0	0	0	0	0	1,494	0	0	0	0	0	0	
85 - 90	0	0	290	253	118	0	0	0		1,602	20	537	0	20	537	0	
80 - 85	954	517	227	585	1,161	1,221	1,140	704	1,182	1,215	1,939	3,376	1,585	1,939	3.338	1.585	
75 - 80	5,027	2,814	136	327	1,752	1,952	2,042	2,359						3,014			
70 - 75	1,202	3,711	0			601		-			1,380		1,340			1,333	
65 - 70	1,418	1,516	0	726	1,391	1,535	1,595	1,677	1,447	1,579	1,283	0	1,476	1,313		1,400	
60 - 65	159	202	0					1,366							0	504	
55 - 60	0	0	0	0	915	869	900	789	953	0	276	0	152	293	0	182	
50 - 55	0	0	0	0	671	632	626	546	658	0	349	0	0	363	0	0	
Below 50	0	0	0	0	1,014	874	845	625	847	0	0	0	0	0	0	0	.*
Min. Temp.	63.8	63.0	68.0	63.6	34 0	34 6	34 7	37.4	35.6	61.7	50 6	67.9	57.7	50.3	67.9	57.5	
Mo./Hr.	1 8	1 10	1 1	2 6	2 11	2 7	2 7	2 7	2 7	1 6	2 7	1 7	1 7	2 7	1 7	1 7	
Day Type	5	5	1	5	4	5	5	5	5		4 7	1 1	5	2 / 5	1 /	1 7	
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MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING

------ MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	STEAM On Peak (Therm)	WATER (1000 Gl)	STEAM DMND On Peak (Thrm/hr)
Jan	163,358	813	12,170	0	72
Feb	147,800	813	11,503	0	72
March	178,338	813	8,726	0	65
April	149,213	813	2,215	0	47
May	191,208	948	0	72	0
June	197,998	1,020	0	- 117	0
July	196,533	1,068	0	192	0
Aug	208,320	1,021	0	129	0
Sept	174,233	971	0	67	0
Oct	163,049	813	1,307	0	46
Nov	152,314	813	4,498	0	58
Dec	155,579	813	10,219	0	71
Total	2,077,943	1,068	50,638	578	72

Building Energy Consumption = 76,070 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

Source Energy Consumption = 175,408 (8tu/Sq Ft/Year)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING

------ EQUIPMENT ENERGY CONSUMPTION------ EQUIPMENT ENERGY

0-4	rauia					14	112 6	. •						
	Equip Code	Jan	Feb	Mar	Apr	mon May	thly Con June	sumption July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS													
	ELEC	78913	71397	86428	75155	82671	82671	75155	86428	75155	82671	75155	75155	946,954
	ÞΚ	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7
1	MISC LD													
	ELEC	0	0	0	0	- 0	0	0	0	0	0	0	0	. 0
	ΡK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD	•		•				_						
	GAS PK	0.0	0 0.0	0 0.0	0 0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0.0	0.0	0 0.0	0
	1 17	0.0	٧.٧	V.V	٧.0	V.V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3		_												/ ·
	bk OIF	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0.0	0	0	0	0	0
	r N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4		•		_	_		_							
	P STEAM PK	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0
		0.0	V. 0	V.V	0.0	0.0	٧.٧	٧.٧	0.0	٧.٧	٧.٧	0.0	. 0.0	0.0
5	MISC LD													
:	P HOTH20 PK	0.0	0 0.0	0.0	0.0	0 0.0	0.0	0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0
	1 10	0.0	ν.υ	0.0	0.0	0.0	V.V	۷.۷	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD	•	•		Â		_	_	_					
	P CHILL PK	0 0.0	0 0.0	0 0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0	0
	A control	V. V	0.0	0.0	0.0	V.V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>i</b>	EQ1001S			IG CTV KS										
	ELEC PK	0.0	0.0	0 0.0	0.0	13792 106.5	20583 178.5	35246 226.8	22840	12946	0	0	0	105,407
Yû Xerris			0.0	V.0	0.0	100.5	170.3	220.0	179.2	129.8	0.0	0.0	0.0	226.8
1	EQ5100	• •		ING TOWE										
sar (1 Ugʻilga (1	ELEC PK	0.0	0 0.0	0	0	5115	5115	4650	5348	4650	0	0	0	24,878
	rn	<b>v.</b> v	V.V	0.0	0.0	23.3	23.3	23.3	23.3	23.3	0.0	0.0	0.0	23.3
• 1	EQ5100			ING TOWE										
1	WATER	0	0	0	0	72	117	192	129	67	0	0	0	578
	PK	0.0	0.0	0.0	0.0	0.6	1.0	1.2	1.0	0.8	0.0	0.0	0.0	1.2
1	EQ5001		CHIL	LED WATE										
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PΚ	0.0	0.0	0.0	0.0	29.8	29.8	. 29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010		CONC	ENSER WA	TER PUM	P C.V.								
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5300		CONT	ROL PANE	L & INT	ERLOCK							٠.	

# EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1 BASE BUILDING

BASE	RAILDING													
	PK	0.0	0.0	0.0	0.0	220 1.0	220 1.0	200	230 1.0	200 1.0	0.0	0.0	0.0	1,070 1.0
2	EQ1000		PRE	VENTS CO	OLING EN	ERGY								35
	ELEC PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5001		CHI	LLED WAT	ER PUMP (	C.V.								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	. 0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
. 2	EQ5010		CON	IDENSER W	ATER PUMP	C.V.								
	ELEC	0	0	0	0	- 0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ4003		FC	CENTRIF.	FAN C.V.	•								
	ELEC	9754	8825	10683	9290	10219	10219	9290	10683	9290	10219	9290	9290	117,051
	PΚ	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4
1	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	2276	2059	2493	2168	2384	2384	2168	2493	2168	2384	2168	2168	27,312
	PK	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
2	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	0	. 0	0	0	0	0	0	0	0	0	0	0	0
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	13975	12644	15305	13309	14640	14640	13309	15305	13309	14640	13309	13309	167,695
	PΚ	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5
3	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	1747	1580	1913	1664	1830	1830	1664	1913	1664	1830	1664	1664	20,962
	PK	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
5	EQ4003		FC	CENTRIF.	FAN C.V.									
4	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076		240,355
:: 	PK 	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
5	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	•
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
6	EQ4003		FC	CENTRIF.	FAN C.V.									•
	ELEC	20030	18122		19076		20983	19076	21937	19076		19076	19076	•
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
6	EQ4003		FC	CENTRIF.	FAN C.V.	ı								
	ELEC	2504	2265	2742	2384		2623	2384	2742	2384	2623	2384	2384	,
	. <b>Р</b> Қ	11.9	11.9	11.9	11.9	11.9	11.9	. 11.9	11.9	11.9	11.9	11.9	11.9	11.9
1	EQ2101		PUR	RCHASED D	ISTRICT S	STEAM								
=	P STEAM	2086	1971	1496	371	0	0	0	O	0	224	769	1751	8,668
	PK	12.4	12.4	11.2	8.0	0.0	0.0	0.0	0.0	0.0	7.9	10.0	12.1	12.4
1	EQ5020		HEA	T WATER	CIRC. PUN	1P C.V.								

	ne Air Condi Trane Custo	•		: Network	(									V 600 Page 18
	IPMENT ENERG E BUILDING	Y CONSUMPI	TION - AL	.TERNATIV	'E 1									
	ELEC	6264	5667	6294	2267	0	0	0	0	0	1909	<b>3</b> 937	5966	32,304
	PK	29.8	29.8	29.8	29.8	0.0	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8
1	EQ5061		COND	ENSATE F	RETURN PUI	MP								
	ELEC	117	106	118	42	0	0	0	0	0	36	74	112	604
	PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
2	EQ2101		PURC	HASED DI	STRICT S	TEAM								
	P STEAM	10084	9532	7231	1844	0	0	0	0	0	1083	3730	8468	41,970
	PK	60.0	60.0	54.1	38.9	0.0	0.0	0.0	0.0	0.0	38.3	48.3	58.5	60.0
2	EQ5020		HEAT	WATER C	CIRC. PUMI	P C.V.								
	ELEC	5220	4723	5717	2386	0	0	0	0	0	2138	3778	4971	28,933
	PK	24.9	24.9	24.9	24.9	0.0	0.0	0.0	0.0	0.0	24.9	24.9	24.9	24.9
2	EQ5061		COND	ENSATE P	RETURN PU	MP								
	ELEC	26	23	28	12	0	0	0	0	0	11	19	25	143
	PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
3	EQ2000		PREV	'ENT SUM	OF HEAT I	ENERGY								
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	<b>EQ</b> 5020		HEAT	WATER C	IRC. PUMI	P C.V.								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### UTILITY PEAK CHECKSUMS - ALTERNATIVE 1 BASE BUILDING

 UTILITY	PEAK	CHECKSUMS	

Utility	ELECTRIC	DEMAND
---------	----------	--------

Peak Value 1,068.1 (kW) Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

Eqp Ref Num	. E	quipment ode Name			Equipment	Description	Utility Demand (kW)	
Coo	ling Equip	oment				-		
1		EQ1001S	2-STG CTV	<555 T	ONS		310.7	29.09
Sub	Total						310.7	29.09
Sub	Total						0.0	0.00
Air	Moving Ed	quipment						
1 3 5 6			SUMMATION SUMMATION	OF FAN	ELECTRICAL ELECTRICAL ELECTRICAL ELECTRICAL	DEMAND DEMAND	57.3 74.9 107.3 107.3	7.01 10.05
Sub	Total						346.8	32.46
Sub	Total						0.0	0.00
	cellaneous	5						
Mis	ghts se Utiliti sc Equipme Total						410.7 0.0 0.0 410.7	38.45 0.00 0.00 38.45
Gran	nd Total						1,068.1	100.00

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 122

Weather File Code: CARLISLE

Location: EMERGY SAVINGS OPPORTUNITY STUDY

Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5

Elevation: 475 (ft)

Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20

Winter Design Dry Bulb: 4
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

 Air Density:
 0.0742 (Lbm/cuft)

 Air Specific Heat:
 0.2444 (8tu/lbm/F)

Density-Specific Heat Prod: 1.0882 (Stu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Stu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 8:42:45 2/ 2/94

Dataset Name: CB122 .TM

AIRFLOW - ALTERNATIVE 2
DOUBLE GLAZED WINDOWS

------ SYSTEM SUMMARY ------ SYSTEM SUMMARY (Design Airflow Quantities)

		~~~~~~~		Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	TRH	10,853	36,175	36,175	36,175	10,853	0	0
2	SZ	0	17,670	17,670	17,670	0	0	17,730
3	INDFP	5,830	19,435	19,435	34,463	19,435	34,668	0
4	UH	0	0	1,835	0	. 0	. 0	0
5	DD	8,357	27,856	27,856	28,711	27,856	0	0
6	DD	8,357	27,856	27,856	28,711	9,212	0	0
Totals		33,397	128,992	130,827	145,730	67,355	34,668	17,730

CAPACITY - ALTERNATIVE 2 DOUBLE GLAZED WINDOWS

------SYSTEM SUMMARY--------(Design Capacity Quantities)

------ Cooling ------ Heating ------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (8tuh) (8tuh) (8tuh) (8tuh) (Btuh) (Btuh) (Btuh) 1 TRH 81.5 0.0 0.0 81.5 -63,1820 -480,162 0 0 -548,345 2 SZ -9,461 0 3.2 0.0 0.0 3.2 -105,950 0 0 0 -9,461 0 0 3 INDEP 45.0 92.8 0.0 137.7 -590,294 -1,092,710 0 0 -1,683,004 4 UH 0.0 0.0 0.0 0.0 -6,715 0 0 0 0 -6,715 5 DD 62.3 0.0 0.0 62.3 -422,817 0 -370,128 0 0 0 -792,945 6 DD 0.0 62.3 62.3 -215,767 0.0 0 -370,128 0 0 -585,894 Totals 254.3 92.8 0.0 347.1 -1,313,236 -1,092,710 -1,326,368 0 -3,626,363

The building peaked at hour 14 month 7 with a capacity of 254.3 tons

ENGINEERING CHECKS - ALTERNATIVE 2
DOUBLE GLAZED WINDOWS

------ ENGINEERING CHECKS------ENGINEERING

			Percent		Coo	ling		Heat	ing	
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	TRH	30.00	0.63	443.7	705.9	17.00	0.63	-9.53	57,549
2	Main	SZ	0.00	4.31	5,606.9	1,301.0	9.22	4.31	-2.31	4,100
3	Main	INDEP	30.00	0.47	432.2	919.8	13.05	0.47	-14.27	41,364
3	Auxiliary	INDFP	0.00	0.84	373.8	446.0	26.91	0.84	-26.42	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	446.9	435.1	27.58	1.03	-29.24	27,121
6	Main	DD	30.00	1.03	446.9	435.1	27.58	1.03	-21.60	27,121

System 1 Peak TRH - TERMINAL REHEAT

	)IL PEAK * :: 13/ 1				Hr: 7		*			/14	10/Hr: 7	Ì	: Time ==>	Peaked a
	3: 4			1 *	DB: 9	0.6	*		0	74/105.	₩8/HR: 9	OADB/	ir ==>	Outside :
Canant	il Peak	lask Ca	Spane De	* Percnt *	ace	c,	* * ercnt*	Nat O		Ret. Air	Opt Sir	Space 1		
Percnt Of Tot	ot Sens		•	Of Tot *		Sensi	of Tot *			Latent	Sensible		Se	
(%)	(Btuh)		•	(%) *	uh)		(%) *		(Bt	(Btuh)	(Btuh)			Envelope
0.00	(01411)	0	•	0.00 *	0	ξυ.	0.00 *	0	(00	(00011)	0	0		Skylit
0.00	0	Ö		0.00 *	0		0.00 *	Ô				Ö		Skylit
0.00	0	0		0.00 *	-		0.00 *	0			0	0		Roof C
0.00	Õ	0		0.00 *	0		0.00 *	0			0	0		Glass
0.00	Ŏ	0		0.00 *	0	•	0.00 *	0			0	0		Glass
0.00	0	0		0.00 *	0		0.00 *	0			0	0		. Wall C
100.00	-68,182	•		4.00 *	940	18.	1.94 *	940	_18,			18,940		Partit
0.00	0	0	•	0.00 *	0		0.00 *	0	,			0	floor	
0.00	0	0		0.00 *	0		0.00 *	0				0		Infilt
100.00	-68,182	-		4.00 *	940	18.	1.94 *	940	18,		0	18,940	tal::>	Sub To
	,		•	*		•	*		·				Loads	Internal
0.00	0	0		89.45 *	020	424,	40.76 *	781	398,		0	398,781		Lights
0.00	0	0		6.56 *	097	31,	6.54 *	941	63,			63,941		People
0.00	0	0		0.00 *	0		0.00 *	0		0	0	0		Misc
0.00	0	0		96.00 *	117	455,	47.30 *	722	462,	0	0	462,722	:al==>	Sub To
0.00	0	0		0.00 *	0		0.00 *	0			0	0	.oad	Ceiling
0.00	0	0		0.00 *	0		41.59 *	913	406,	0	0	0	Air	Outside (
0.00	. 0			0.00 *			7.89 *	173	77,					Sup. Fan
0.00	0			0.00 *			1.84 *		18,		18,007			Ret. Fan
0.00	0			0.00 *			0.00 *				0		•	Duct Hea
0.00	0	0	•	-0.00 *	0		-0.00 *					0	_	OV/UNDR
0.00	0			0.00 *			-0.55 *		-5,	0	-5,402			Exhaust
0.00	0			0.00 *			0.00 *	0		0	0		Bypass	Terminal
				*			*							
100.00	-68,182	182	-68,1	100.00 *	057	474,	00.00 *	353 10	978,	0	12,605	481,661	al==>	Grand To
	:AS													
(%)	Glass (sf		Gross Tot							Coil Airfl		•	Total Ca	
		•			_						(Mbh)		(Tons)	
			Part	74.8				67.5		36,175			81.5	Main Clg-
			ExFlr		0.0	0.0		0.0	0.0	0	0.0	0.0		
0 0		0	Roof	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0			Opt Vent
0 0		0	Wall									9/8.4	81.5	
(F)	PERATURES	TEM	CHECKS	IGINEERING	E							COIL SELECTI		
		Тур	30.0	% OA	Clg	Heating	oling	Cod	Type	Lvg	. Ent	Coil Airfl	Capacity	" ÷ .
		SADB	0.63	Cfm/Sqft	Clg	0	0,853	10	Vent	Deg F	Deg F	(cfm)	(Mbh)	
		Plenu		Cfm/Ton	Clg	0 0 36,175 0 36,175	0		Infil	69.7	00.0	00,110	00,2	marii mov
	n 75.5	Retur	705.87	Sqft/Ton	Clg	36,175	6,175	36	Supply	0.0	0.0	0 36,175	0.0	Aux Htg
	A 80.0	Ret/O		Btuh/Sqft	Clg	0	6,175	36	Mincfm	61.0	48.8	36,175	-480.2	Preheat
	nd 75.0	Runar	137	People	No.	36,175	6,175	36	Return	0.0	0.0	0	-0.0	Reheat
	rID 0.5	Fn Mt	0.0	% OA	nty	V	0,000	1 (	LAHAUSU	V.V	0.0	0		Humidif
0.4	dTD 0.4	Fn Bl	0.63	Cfm/SqFt	Htg	0	0		Rm Exh	0.0	0.0	0	0.0	Opt Vent
	ict 1.1	Fn Fr	-9.53		U+a	0	۸		Auxil				-548.3	Total

System 2 Peak SI - SINGLE ZONE

Peaked at Time   TOULING COLL   Fast   TOU	*****	******	*******	חחו זאר רחזו	DEAV ****	******	*******	*****	י פטאפו	• በሮልሃ ቀቀቀቀ	****** 11FA	TT-110 00T1	5	
Comparison   Com						****	*****							******
Same	1.746				•	٥						, =	-	
Same	ga Artina	n1:/	UN	oojmojun. :	71, 75, 70.	V		* (	י פעאנ	71 *		บลบช:	4	ar k <del>a</del> fa
Envelope Loads			Snace	Ret Sir	Ret Air	Not	Derent	* (	Snace	Borost ±	Cnaco Do	ok Coil	Bask	
Envelope Loads									-					
Skylite Solr	Envelope													
Skylite Cond							. ,	,			•			
Roof Cond									-			-		
Glass Colar 531 0 531 1.40 \$\pi\$ 531 1.53 \$\pi\$ 0 0 0.00 \$\text{Colar Mall Codo}\$ 162 0.43 \$\pi\$ 162 0.47 \$\pi\$ -766 6 -766 11.16 \$\text{Mall Codo}\$ 1747 183 \$\text{Mall Codo}\$ 162 0.45 \$\pi\$ 162 0.47 \$\pi\$ -766 6 -766 11.16 \$\text{Mall Codo}\$ 1747 183 \$\text{Mall Codo}\$ 0 0.00 \$\pi\$ 0 0.00 \$\pi\$ 0 0.00 \$\pi\$ 0 0.00 \$\pi\$ 0 0.00 \$\pi\$ 0 0.00 \$\text{Mall Codo}\$ 0 0 0.00 \$\pi\$ 0 0.00 \$\pi\$ 0 0.00 \$\pi\$ 0 0.00 \$\text{Mall Codo}\$ 0 0 0.00 \$\pi\$ 0 0.00 \$\text{Mall Codo}\$ 0 0 0.00 \$\pi\$ 0 0.00 \$\text{Mall Codo}\$ 0 0.00 \$\pi\$ 0 0.00 \$\text{Mall Codo}\$ 0 0.00 \$\pi\$ 0 0.00 \$\text{Mall Codo}\$ 0 0.00 \$\pi\$ 0 0.00 \$\text{Mall Codo}\$ 0 0.00 \$\pi\$ 0 0.00 \$\text{Mall Codo}\$ 0 0.00 \$\pi\$ 0 0.00 \$\text{Mall Codo}\$ 0 0.00 \$\pi\$ 0 0.00 \$\text{Mall Codo}\$ 0 0.00 \$\pi\$ 0 0.00 \$\text{Mall Codo}\$ 0 0.00 \$\pi\$ 0 0.00 \$\text{Mall Codo}\$ 0 0.00 \$\pi\$ 0 0.00 \$\text{Mall Codo}\$ 0 0.00 \$\text{Mall Codo}\$ 0 0.00 \$\text{Mall Codo}\$ 0 0.00 \$\text{Mall Codo}\$ 0 0.00 \$\text{Mall Codo}\$ 0 0.00 \$\text{Mall Codo}\$ 0 0.00 \$\text{Mall Codo}\$ 0 0 0 0.00 \$\text{Mall Codo}\$ 0 0 0.00 \$\text{Mall Codo}\$ 0 0 0 0 0.00 \$\text{Mall Codo}\$ 0 0 0 0 0.00 \$\text{Mall Codo}\$ 0 0 0 0 0.00 \$\text{Mall Codo}\$ 0 0 0 0 0 0.00 \$\text{Mall Codo}\$ 0 0 0 0 0 0.00 \$\text{Mall Codo}\$ 0 0 0 0 0 0.00 \$\text{Mall Codo}\$ 0 0 0 0 0 0.00 \$\text{Mall Codo}\$ 0 0 0 0 0 0.00 \$\text{Mall Codo}\$ 0 0 0 0 0 0.00 \$\text{Mall Codo}\$ 0 0 0 0 0 0.00 \$\text{Mall Codo}\$ 0 0 0 0 0 0.00 \$\text{Mall Codo}\$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	· .								-					
Glass Cond   162   0														
Mail Cond														
Partition														
Exposed Floor	4.1			103							•		-	
Infiltration 0 0 0.00			-			-			-				_	
Sub   Total   Total   Total   Capacity   Sens Cap.   Coll   Air   Coll   Steet   Total   Capacity   Sens Cap.   Coll   Air   Coll   Steet   Total   Capacity   Sens Cap.   Coll   Air   Total   Capacity   Coll   Air   Total   Capacity   Coll   Air   Total   Capacity   Coll   Air   Total   Capacity   Coll   Air   Total   Capacity   Coll   Air   Total   Capacity   Coll   Air   Total   Capacity   Coll   Air   Total   Capacity   Coll   Air   Total   Capacity   Coll   Air   Total   Capacity   Coll   Air   Total   Capacity   Coll   Air   Total   Capacity   Coll   Air   Total   Capacity   Coll			-						-			-		
Internal Loads				1 040					•			•	-	
Lights			1,440	1,042		2,483	6.56		,440			52 <b>-6</b>	,860	100.00
People			70 (07	_				•						
Misc 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-			0					-			0	0	
Sub Total==> 35,335	•	:							•			0	0	
Ceiling Load				•	_							0	0	0.00
Outside Air			•	-	0	35,335						•	0	0.00
Sup. Fan Heat				•		0						43	0	0.00
Ret. Fan Heat			0	0	0	0			0			0	0	0.00
Duct Heat Pkup				_		-							0	0.00
OV/UNDR Sizing 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						0							0	0.00
Exhaust Heat				0		0							0	0.00
Terminal Bypass		-	0			0			Ō	-0.00 *	•	0	0	0.00
Crand Total   Sa,693				0	0	0	0.00	*		0.00 *			0	0.00
Total Capacity Sens Cap. Coil Airfl Entering D8/W8/HR Leaving D8/W8/HR Gross Total Glass (sf) (%)  (Tons) (Mbh) (Mbh) (Cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 4,100  Main Clg 3.2 37.8 35.3 17,670 76.6 68.9 96.9 73.2 68.3 99.1 Part 0  Aux Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Terminal	Bypass		0	0	0	0.00	*		0.00 *			0	0.00
Total Capacity   Sens Cap.   Coil Airfl   Entering D8/W8/HR   Leaving D8/W8/HR   Gross Total   Glass (sf) (%)	Grand To	tal==>	38,693	-876	0	37,817	100.00	* 34	,683	100.00 *	-3,2	95 -6	,860	100.00
Total Capacity   Sens Cap.   Coil Airfl   Entering D8/W8/HR   Leaving D8/W8/HR   Gross Total   Glass (sf) (%)					מפ ווחם מעד	I FOTTON						ADEAC		
Main Clg   3.2   37.8   35.3   17,670   76.6   68.9   96.9   73.2   68.3   99.1   Part   0	Alternation of										Crace Total			
Main Clg         3.2         37.8         35.3         17,670         76.6         68.9         96.9         73.2         68.3         99.1         Part         0           Aux Clg         0.0		(Ions)	(Mhh)	(Mhh)	(rfm)	Dea F Doo	ig vu/mo/i	uc Doa's					55 (5	(%)
Aux Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Main Clo											*		
Opt Vent														
Totals 3.2 37.8   Wall 196 21 11   196 21														
	,			<b>v</b> .v	V	0.0 0	0	.0 0.0	0.0	0.0				
Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 0.0 Type Clg Htg (Mbh) (cfm) Deg F Deg F Vent 0 0 Clg Cfm/Sqft 4.31 SADB 73.2 68.2 Main Htg -9.5 17,670 67.7 68.2 Infil 0 0 Clg Cfm/Ton 5606.95 Plenum 76.5 67.7 Aux Htg 0.0 0 0.0 Supply 17,670 17,670 Clg Sqft/Ton 1300.99 Return 79.7 67.7 Preheat -106.0 17,670 67.7 73.2 Mincfm 0 0 Clg Btuh/Sqft 9.22 Ret/OA 76.6 67.7 Reheat 0.0 0 0.0 Return 0 17,670 No. People 10 Runarnd 75.0 68.0 Humidif 0.0 0 0.0 0.0 Exhaust 0 0 Htg % OA 0.0 Fn MtrID 0.0 0.0 Opt Vent 0.0 0 0.0 0.0 Rm Exh 17,730 0 Htg Cfm/Sqft 4.31 Fn 8ldTD 0.0 0.0		HFATTN	IG COTI SELE	CTION		ATO	ICLONE (a	Fm.)		ENCTHEENTHO	CHECKE	TEMATA	TUOP	. (5)
(Mbh)         (cfm)         Deg F         Deg F         Vent         0         0         Clg Cfm/Sqft         4.31         SADB         73.2         68.2           Main Htg         -9.5         17,670         67.7         68.2         Infil         0         0 Clg Cfm/Ion         5606.95         Plenum         76.5         67.7           Aux Htg         0.0         0         0.0         Supply         17,670         17,670         Clg Sqft/Ion         1300.99         Return         79.7         67.7           Preheat         -106.0         17,670         67.7         73.2         Mincfm         0         0 Clg Btuh/Sqft         9.22         Ret/OA         76.6         67.7           Reheat         0.0         0         0.0         Return         0         17,670         No. People         10         Runarnd         75.0         68.0           Humidif         0.0         0         0.0         Exhaust         0         0         Htg % 0A         0.0         Fn MtrID         0.0         0.0           Opt Vent         0.0         0         0.0         Rex         17,730         0         Htg Cfm/Sqft         4.31         Fn BldTD         0.0         0.0														
Main Htg         -9.5         17,670         67.7         68.2         Infil         0         0         Clg Cfm/Ton         5606.95         Plenum         76.5         67.7           Aux Htg         0.0         0         0.0         Supply         17,670         17,670         Clg Sqft/Ton         1300.99         Return         79.7         67.7           Preheat         -106.0         17,670         67.7         73.2         Mincfm         0         0         Clg Btuh/Sqft         9.22         Ret/OA         76.6         67.7           Reheat         0.0         0         0.0         Return         0         17,670         No. People         10         Runarnd         75.0         68.0           Humidif         0.0         0         0.0         Exhaust         0         Htg % OA         0.0         Fn MtrTD         0.0         0.0           Opt Vent         0.0         0         0.0         RExh         17,730         0         Htg Cfm/SqFt         4.31         Fn BldTD         0.0         0.0	•		-		-		-	-		-			_	_
Aux Htg         0.0         0         0.0         0.0         Supply         17,670         17,670         Clg Sqft/Ton         1300.99         Return         79.7         67.7           Preheat         -106.0         17,670         67.7         73.2         Mincfm         0         0 clg Stuh/Sqft         9.22         Ret/OA         76.6         67.7           Reheat         0.0         0         0.0         Return         0         17,670         No. People         10         Runarnd         75.0         68.0           Humidif         0.0         0         0.0         Exhaust         0         Htg % OA         0.0         Fn MtrTD         0.0         0.0           Opt Vent         0.0         0         0.0         Rexh         17,730         0         Htg Cfm/SqFt         4.31         Fn BldTD         0.0         0.0	Main Uta		•		-									
Preheat         -106.0         17,670         67.7         73.2         Mincfm         0         0         Clg Btuh/Sqft         9.22         Ret/OA         76.6         67.7           Reheat         0.0         0         0.0         0.0         Return         0         17,670         No. People         10         Runarnd         75.0         68.0           Humidif         0.0         0         0.0         Exhaust         0         0         Htg % DA         0.0         Fn MtrTD         0.0         0.0           Opt Vent         0.0         0         0.0         Rm Exh         17,730         0         Htg Cfm/SqFt         4.31         Fn BldTD         0.0         0.0	-		•							-				
Reheat 0.0 0 0.0 0.0 Return 0 17,670 No. People 10 Runarnd 75.0 68.0 Humidif 0.0 0 0.0 Exhaust 0 0 Htg % DA 0.0 Fn MtrTD 0.0 0.0 Opt Vent 0.0 0 0.0 Rm Exh 17,730 0 Htg Cfm/SqFt 4.31 Fn BldTD 0.0 0.0	-													
Humidif         0.0         0.0         0.0         Exhaust         0         0 Htg % DA         0.0         Fn MtrTD         0.0         0.0           Opt Vent         0.0         0.0         0.0         Rm Exh         17,730         0 Htg Cfm/SqFt         4.31 Fn BldTD         0.0         0.0														
Opt Vent 0.0 0 0.0 0.0 Rm Exh 17,730 0 Htg Cfm/SqFt 4.31 Fn BldTD 0.0 0.0														
Tabah										-				
O Htg Btuh/SqFt -2.31 Fn Frict 0.0 0.0				U 0.0										
	10101	-9.	5			Auxil	. 0	0	Ht	g Btuh/Sqft	-2.31	Fn Frict	0.0	0.0

***			tioning Econ mer Direct S	nomics Service Netwo	ork										600 GE <b>25</b>
	System	<b>3</b>	Block	INDFP	- 4-PIPE	INDUCTION							•	i Bir Jane	
	*****		++++++++++++++++++++++++++++++++++++++		ጠርሃኒ ጥተስጥተ፡	<b>~~~~~~~~~</b>			****	00405	DEAN 4444	***		ida ji	
		at Time		OOLING COIL: 7		*****	*****	*		SPACE /Hr:			ATTNG COIL Mo/Hr: 1		******
The same		at 11mc 3 Air ==>		IDB/WB/HR: 9		0		*		ADB:	•		OADB:	4	1.0
i Ata			VII.	iooj noj na.	11, 14,100.	v		*		1100.	*		UNDU.	T :	
			Space	Ret. Air	Ret. Air	Nε	et Perc	nt *	S	pace	Percnt *	Space Po	eak Coil	Peak	Percnt
. A.s. 7 2			Sens.+Lat.	Sensible	Latent		al Of T				Of Tot *	•			Of Tot
	Envelo	e Loads	(Btuh)	(Btuh)	(Btuh)	(Btul	1) (	%) *	(B	tuh)	(%) *	•		tuh)	(%)
	2 °	ite Solr	0	0			0 0.	00 *		0	0.00 *		0	0	0.00
	·	ite Cond	0	0				00 *		0	0.00 *		0	0	0.00
· ·	Roof		474	21,484		21,95		31 *		740	0.13 *	,	579 <b>-73</b>	446	4.36
		Solar	154,605	0		154,60		19 *		,868	24.40 *		0	0	0.00
7.59	1	Cond	36,551	0		36,55		17 *		,143	4.24 *				11.03
	Wall		113,330	16,902		130,23		74 *		,726	30.35 *				22.42
	Part	ition sed Floor	0					00 * 00 *		0	0.00 *		0	. 0	0.00
		tration	650,287			650,28		00 *		0	0.00 * 22.24 *		0 619 -1,046	, V	0.00 62.19
		(otal==>	955,246	38,386		993,63		07 *		,598 ,073	81.37 *		224 -1,683		100.00
		al Loads	733,240	00,000		770,00	)	*		,075	*		224 -1,000	,004	100.00
	Light		277,628	0		277,62	28 16.	51 *	75	,396	13.25 *		0	0	0.00
	Peopl		45,248	·		45,24		69 *		,354	0.94 *		Ö	Ö	0.00
	Misc		0	0	0			00 *		0	0.00 *		0	0	0.00
	Sub 1	otal::>	322,876	0	0	322,87		20 *		,750	14.19 *		0	0	0.00
	Ceiling	g Load	14,654	-14,654			0 0.	00 *		,171	4.42 *	-47,8	B11	0	0.00
-	Outside		0	0	0	252,29	9 15.	00 *		0	0.00 *		0	0	0.00
	Sup. Fa					110,56		57 *			0.00 *			0	0.00
	Ret. Fa			13,820		13,82		82 *			0.00 *			0	0.00
		at Pkup	105	0				00 *			0.00 *			0	0.00
e e		Sizing	122	11.0//	۸	12		01 *		122	0.02 *		0	0	0.00
	Exhaust	neat 1 Bypass		-11,266 0	0	-11,26		67 <b>*</b> 00 <b>*</b>			0.00 * 0.00 *			0	0.00
	101 mine	ii Uypass		V	U		0 0.	*			V.00 *			U	0.00
	Grand T	otal==>	1,292,898	26,287	0	1,682,04	8 100.	00 *	569	,116	100.00 *	-1,610,0	35 -1,683	004	100.00
				COOL	ING COIL S	ELECTION							AREAS-		
	1.3			Sens Cap.									tal Glas		
				(Mbh)	(cfm)	Deg F D	eg F G	rains	Deg F			Floor		•	, , ,
			539.6	385.7	19,435	80.9	66.7	78.0	60.4	58.0	70.1	Part	0		
			3 1,113.0	720.5	34,668	75.0	63.8	73.2	65.7		41.6	ExFlr	0		
			0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	14,680		0 0
	lotals	13/.	1,652.6									Wall	28,354	5,1	52 18
		UEAT	ואר בחזו פבו	ECTION		^	TOELOMO	(ofm)	\	1		AHEAK <b>A</b>	TCHOCO	TU050	(5)
rakit, bili kili Kajar ding		Canaci	ity Chil A	ECTION irfl Ent	Lvo	Type	ituu). Emuunnii	(CIII) na	Heating	{	ingineering 3 % OA	70 A	Type		
		(Mhl	n) (cf.	m) Deg F		Vent					у % он g Cfm/Sqft	30.0 7 A 7	rype SADB	Clg 65.7	Htg 92.4
	Main Htg				92.4	Infil					g Cfm/Jqrt g Cfm/Ton		Plenum	76.1	
	Aux Htg		,	668 68.0		Supply					Sqft/Ton		Return	76.8	
	Preheat				60.4		,		0		g Btuh/Sqft		Ret/OA	80.9	
	Reheat	(	0.0	0.0	0.0	Return	19,4		19,435	No.	. People	98	Runarnd	75.0	
	Humidif			0.0	0.0		5,8		0	Нt	3 % OA	0.0	Fn MtrTD		
	Opt Vent			0.0	0.0	Rm Exh			0		Gfm/SqFt		Fn BldTD	1.0	l l
	Total	-1,683	3.0			Auxil	34,6	68	34,668	Htq	Btuh/SqFt	-14.27	Fn Frict	2.9	2.9

System 4 Block UH - UNIT HEATERS

******	*******	***** C(	OLING COIL	PEAK ****	******	*****	******	**** CLG	SPACE	PEAK ****	****** HEA	TING COIL	PEAK *	*****
	t Time ==>		Mo/Hr:				*			/ 0 *		Mo/Hr: 1		
Outside	Air ==>	DAO			0		*			0 *		OADB:	4	
							*			*				***
		Space	Ret. Air	Ret. Air	N	et Pe	rcnt *	S	pace	Percnt *	Space Pe	ak Coil	Peak	Percnt
erent of the second of the sec	Se	ns.+Lat.	Sensible	Latent	Tot	al Of	Tot *	Sens		Of Tot *	Space Se			Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btu	h)	(%) *	(B1	tuh)	(%) *	(Btu		tuh)	(%)
Skylit	e Solr	0	0			0	0.00 *	·	Ô	0.00 *	,	Ó `	Ó	0.00
Skylit	e Cond	0	0			0	0.00 *		0	0.00 *		0	0	0.00
Roof Co	ond	0	0			0	0.00 *		0	0.00 *		0	0	0.00
Glass	Solar	0	0			0	0.00 *		0	0.00 *		0	0	0.00
Glass	Cond	0	0			0	0.00 *		0	0.00 *		0	0	0.00
Wall Co		0	0			0	0.00 *		0	0.00 *		0	0	0.00
Partit:		0			-	0	0.00 *		0	0.00 *	-6,7	15 <b>-6</b>	,715	100.00
Expose	d Floor	0				0	0.00 *		.0	0.00 *		0	0	0.00
Infilt		0				0	0.00 *		0	0.00 *		0	0	0.00
Sub To		0	0			0	0.00 *		0	0.00 *	-6,7	15 <b>-6</b>	,715	100.00
Internal	Loads						*			*				•
Lights		0	0			0	0.00 *		0	0.00 *		0	0	0.00
People		0					0.00 *		0	0.00 *		0	0	0.00
Misc		0	0	0			0.00 *		0	0.00 *	-	0	0	0.00
Sub Tot		0	0	0			0.00 *		0	0.00 *		0	0	0.00
Ceiling (		0	0				0.00 *		0	0.00 *		0	0	0.00
Outside 4		0	0	0			0.00 *		0	0.00 *		0	0 1	0.00
Sup. Fan							0.00 *			0.00 *			0	0.00
Ret. Fan			0				0.00 *			0.00 *			0	0.00
Duct Heat		_	0				0.00 *			0.00 *			0	0.00
OV/UNDR S	-	0					0.00 *		0	0.00 *	•	0	0	0.00
Exhaust 1			0	0			0.00 *			0.00 *			0	0.00
Terminal	Bypass		0	0		0	0.00 *			0.00 *			0	0.00
Grand Tot		Λ	^	^		^	*		•	*				
Grand for	ld1>	0	0	0		0	0.00 *		0	0.00 *	-6,7	15 -6	,715	100.00
				ING COIL S	EL COTTON							40540		
	Total Ca	anacitu		Coil Airfl		rina D	B/WB/HR	Loon	ina Do	/WB/HR	C T-4	AREAS-		) (0.)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F.	_			-	Grains	Gross Tot Floor		55 (ST	) (%)
Main Clg -		0.0	0.0	(CIM)	0.0	0.0	0.0	0.0	0.0	0.0	Part	2,544 1,632		
Aux Clg	0.0	0.0	0.0	0		0.0	0.0	0.0	0.0	0.0	Exflr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	0		^ ^
Totals	0.0	0.0	0.0	V	0.0	V.V	V. 0	0.0	<b>v.</b> v	V.V	Wall	0		0 0
	•••	0.0									Mall	V		ا ۲۰۰۰
·	HEATING	COIL SELF	CTION			ATREL O	WS (cfm)		F	NGINEERING	CHECKS	TEMPER	ATHOES	(5)
	Capacity				Туре			Heating		% OA	0.0	Туре	Clg	Htg
	(Mbh)	(cfm		Deg F	Vent		0	0	_	Cfm/Sqft	0.00	SADB	0.0	
Main Htg	-6.7			71.4	Infil		Ŏ	0		Cfm/Ton	0.00	Plenum	0.0	
Aux Htg	0.0	•	0 0.0	0.0	Supply		Ö	1,835		Sqft/Ton	0.00	Return	0.0	
Preheat	0.0		0 0.0	0.0	Mincfm		Ö	0	_	8tuh/Sqft	0.00	Ret/OA	0.0	
Reheat	0.0		0 0.0	0.0	Return		0	1,835		People	0.00	Runarnd	0.0	
Humidif	0.0		0 0.0	0.0	Exhaust		Ö	0		% OA	0.0	Fn MtrTD	0.0	
Opt Vent	0.0		0 0.0	0.0	Rm Exh		Ō	0	_	Cfm/SqFt	0.72	Fn BldTD	0.0	
Total	-6.7		•••		Auxil		. 0	0	-	Btuh/SqFt	-2.64	Fn Frict		
=							-	·					0.1	۱ ۲۰۰

System 5 Block DD - DOUBLE DUCT

	******	********	****** C	OOLING COIL	PEAK ****	******	*****	*****	**** CLG	SPACE	PEAK ****	****** HEA	ATING COIL	PEAK	******
		t Time ==:		Mo/Hr:				*		/Hr: 7		ţ .	Mo/Hr: 1		
	Outside (	Air ==>	0A	DB/WB/HR:	91/ 74/105.	0		*	0.	ADB: 9	91	<b>,</b>	OADB:	•	
								*			,	ţ			M. S. T.
			Space	Ret. Air	Ret. Air	N	let Per	rent *	S	pace	Percnt >	Space Pe	ak Coil	Peak	Percnt
		Se	ens.+Lat.	Sensible	Latent		al Of			-	Of Tot	•			Of Tot
	Envelope	Loads	(Btuh)	(8tuh)	(Btuh)	(Btu	ıh)	(%) *		tuh)	(%)	•		tuh)	(%)
	Skylite	e Solr	0	0	· · · · · ·	`	•	).00 *		Ó	0.00	•	0	0	0.00
	Skylite		0	0				).00 *		0	0.00		0	. 0	0.00
	Roof Co	ond	14,486	0		14,4		.94 *		,221	5.86			,286	24.48
	Glass S		15,817	0		15,8		2.11 *		,694	5.31	,	0	0	0.00
	Glass (		3,286	0		3,2		).44 *		,509	1.27		-	,588	8.41
	Wall Co		4,161	526		4,6		).63 *		,622	2.03	•	577 <b>-</b> 18	•	9.59
	Partiti		. 0			_ ′		.00 *		0	0.00	•		0	0.00
	Exposed	d Floor	0					.00 *		0	0.00		0	-	0.00
. *	Infilt		29,259			29,2		3.91 *		,420	5.21		539 -59		30.18
	Sub Tot		67,009	526		67,5		7.03 *		,465	19.67			-	72.66
	Internal		. ,			,-		*		, 1.25	, , , ,	•	,,,	, 00 1	72.00
	Lights		190,447	0		190,4	47 25	5.46 *	200	,839	72.53	(	0	0	0.00
	People		30,203	· ·		30,2		.04 *			5.28		0	0	0.00
	Misc		0	0	0			).00 *		0	0.00		0	0	0.00
	Sub Tot	tal==>	220,650	0	=	220,6		).50 *		,452	77.81		0	Ŏ	0.00
	Ceiling L		1,375	-1,375	•	220,0		).00 *			0.56		-	0	0.00
	Outside A		0	0		286,0		3.24 *		, 550	0.00	,	0	Ô	0.00
	Sup. Fan		·	•	•	158,4		.19 *		v	0.00		V	0	0.00
	Ret. Fan			19,809		19,8		2.65 *			0.00			0	0.00
	Duct Heat			0		27,0		).00 *			0.00			n	0.00
	OV/UNDR S		5,428	·		5,4		).73 *		,428	1.96		126 <b>-</b> 53	,926	27.34
	Exhaust H	_	3,120	-9,934	0	-9,9		.33 *		, 120	0.00	,	, 20 30	, , , 20	0.00
	Terminal			7,701		,,,		1.00 *			0.00			0	0.00
		٠, ٢,٠٠٠		v	v		•	*			v. v			v	0.00
	Grand Tot	:al==>	294,461	9,026	0	747,9	73 100	.00 *	276	,897	100.00	-199,6	643 -197	,260	100.00
				coo	ING COTE S	FLECTION-							AREAS-		
	* -			Sens Cap.								Gross Tot			f) (%)
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	*	(Tons)	(Mbh)		(cfm)						Grains		27,121	JJ (J	'' (*'
	Main Clg		748.0	571.6		-	68.3		-	_	79.7	Part	,		
3.	Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0		0.0	0.0	ExFlr	Ö		
Pro-	Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0		0.0		Roof	8,563		0 0
	Totals		748.0		•	• • • •			***	•••	***	Wall	1,613		460 29
n in the second													-,		''' [
		HEATING	COIL SELE	ECTION			AIRFLOW	S (cfm	)	F	NGINEERING	CHECKS	TEMPER	ΔΤΙΙΩΕ	S (F)
			Coil Ai			Type	Cool	-	Heating		; % OA	30.0	Туре	Clg	
		(Mbh)			Deg F	Vent		357	0		Cfm/Sqft		SADB	65.	- 1
3.	Main Htg			_	74.6	Infil	٠,		855		Cfm/Ton	446.90	Plenum	75.	
	Aux Htg	0.0			0.0	Supply		856	27,856		Sqft/Ton		Return	76.	
•	Preheat	-370.1			60.6	Mincfm		0	27,030	-	, Sqre/Ton , Btuh/Saft		Ret/OA	80.	
	Reheat	0.0		0 0.0	0.0	Return		856	27,856	_	People	65	Runarnd	75.	
	Humidif	0.0		0 0.0	0.0	Exhaust		357	27,030		3 % OA		Fn MtrTD		
	Opt Vent	0.0		0 0.0	0.0	Rm Exh		0	0		Cfm/SqFt		fn 81dTD		
	Total	-792.9		v.v	V.V	Auxil		. 0	0		; Cim/Sqrt ; Btuh/SqFt		Fn Frict		
		(//				HUNTI		. •	V	neg	s nrantodi i	47.44	in riict	۷.	, 4.7

System 6 Block DD - DOUBLE DUCT

*****	******	****** C	OOLING COIL	PEAK ****	********	*******	***** CLG	SPACE	PEAK ****	****** HEAT	TING COTE P	EAK ******
	t Time ==:		Mo/Hr:					/Hr:			Mo/Hr: 13	
	Air ==>		D8/W8/HR:		0			AD8: '	•			4
			, ,	, ,	,		*		*		4.1501	÷.
		Space	Ret. Air	Ret. Air	Net	Percnt	* S	pace	Percnt *	Space Pea	ak Coil P	eak Percnt
	Se	ens.+Lat.	Sensible		Total				Of Tot *			
Envelope	Loads	(8tuh)	(Btuh)		(Btuh)	(%)		tuh)	(%) *			
Skylit	e Solr	0	0		. 0	0.00		Ó	0.00 *		0	0 0.00
Skylit	e Cond	0	0		. 0	0.00	*	0	0.00 *		0	0 0.00
Roof C	ond	14,486	0		14,486	1.94	* 16	, 221	5,86 *		36 -48,	
Glass	Solar	15,817	0		15,817			,694	5.31 *	•	0	0 0.00
Glass	Cand	3,286	0		3,286	0.44		,509	1.27 *		38 -16,	
Wall C	ond	4,161	526		4,687	0.63		,622	2.03 *	•	•	
Partit:	ion	0			_ 0	0.00		0	0.00 *		0	
Expose	d Floor	0			0	0.00	*	0	0.00 *		0	0 0.00
Infilt	ration	29,259			29,259	3.91	* 14	,420	5.21 *		39 -59,	•
Sub To	tal==>	67,009	526		67,535	9.03		,465	19.67 *	•	•	
Internal	Loads						*		*	,	,	
Lights		190,447	0		190,447	25.46	* 200	,839	72.53 *		0	0 0.00
People		30,203			30,203	4.04	<b>*</b> 14.	612	5.28 *		0	0 0.00
Misc		0	0	0	0	0.00	*	0	0.00 *		0	0.00
Sub To		220,650	0	0	220,650	29.50		452	77.81 *		0	0.00
Ceiling (		1,375	-1,375		0	0.00		,553	0.56 *	-4,62	27	0.00
Outside a		0	0	0	286,016			0	0.00 *		0	0.00
Sup. Fan					158,470				0.00 *			0.00
Ret. Fan			19,809		19,809	2.65			0.00 *			0.00
Duct Hear		5 /00	0		0				0.00 *			0 0.00
OV/UNDR S	-	5,428	2 22/	Ā	5,428			,428	1.96 *	,	26 -53,9	
Exhaust (			-9,934		-9,934				0.00 *			0.00
Terminal	вуразз		0	0	0	-0.00	*		0.00 *			0.00
Grand Tot	tal==>	294,461	9,026	0	747 973	100.00		.897	* 100.00 *		3 -197,	260 100.00
		271,102	,,020	V	717,770	100.00	170,	,0,,	100.00	1//,04	171,1	200 100.00
				ING COIL SI							AREAS	
			Sens Cap.			ng D8/W8/H		∕ing D8	B/WB/HR	Gross Tota	l Glass	s (sf) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	-		-	Deg F	Grains	Floor 2	27,121	
Main Clg	62.3	748.0	571.6	27,856	80.4 68			60.3	79.7	Part	0	
Aux Clg	0.0	0.0	0.0	0		).0 0.		0.0	0.0	Exflr	0	
Opt Vent	0.0	0.0	0.0	0	0.0 0	).0 0.	0.0	0.0	0.0		8,563	0 0
Totals	62.3	748.0								Wall	1,613	460 29
	HEATTNO	COTI SELE			AIR	DELONG (of	m)	{	ENGINEERING	CAECAG	YEMDEDA	(UOCO /c)
		Coil Ai				Cooling	, Heating		3 % OA		Туре	rures (F) Clg Htg
	(Mbh)				Vent	_	0	•	g Cfm/Sqft	1.03	SADB	Clg Htg 65.9 74.6
Main Htg	-215.8	-		_		855	855		g Cfm/Jqrt g Cfm/Ton		Plenum	75.4 66.5
Aux Htg	0.0		0 0.0		Supply		27,856		Sqft/Ton	435.11	Return	76.1 67.5
Preheat	-370.1					0	0		Btuh/Sqft		Ret/OA	80.4 67.5
Reheat	0.0		0.0	0.0	Return	27,856	_		. People	65	Runarnd	75.0 68.0
Humidif	0.0				Exhaust	8,357	0		% OA	0.0	Fn MtrTD	1.3 1.3
Opt Vent	0.0		0.0	0.0	Rm Exh	0	0		Cfm/SqFt		Fn BldTD	1.0 1.0
Total	-585.9	)			Auxil	0	0		Btuh/SqFt		Fn Frict	2.9 2.9
								-				

BUILDING U-VALUES - ALTERNATIVE 2
DOUBLE GLAZED WINDOWS

----- BUILDING U-VALUES------

		****			Room Mass	Room Capac.						
Room				Summr	Wintr	/hr/sqf	Summr	Wintr			(1b/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof		Windo	Wall	Ceil.	sqft)	sqft/F)
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000_	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	<pre>1 Total/Ave.</pre>	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	29.4	5.93
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	<pre>11 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.229	0.000	103.3	21.63
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.229	0.000	103.3	21.63
5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	102.3	21.84
12	STAIRS W ROOF	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.229	0.000	146.4	31.13
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.229	0.000	146.4	31.13
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.256	0.317	74.1	15.63
13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	13 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	27.0	5.41
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.000	71.5	15.21
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	32.5	6.60
Zone	<pre>14 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	27.0	5.41
Zone	15 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.000	71.5	15.21
Zone	<pre>16 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	43.1	8.94
Buildin	g	0.229	0.000	0.000	0.000	0.088	0.550	0.563	0.256	0.317	52.6	10.93

BUILDING AREAS - ALTERNATIVE 2
DOUBLE GLAZED WINDOWS

100													
				Floor	Total		Exposed						
		Numbe	er of	Area/Dupl	Floor	Partition	Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room		Dupli	icate	Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	SUB BSMT, BSMT W	1	1	45,125	45,125	13,222	0	0	0	0	0	0	0
Zone	1 Total/Ave.				45,125	13,222	0	0	0	0	0	0	0
4	BSMT E	1	1	12,424	12,424	3,348	0	0	0	0	0	0	0
Zone	4 Total/Ave.				12,424	3,348	0	0	0	Ó	0	0	,0
System	1 Total/Ave.				57,549	16,570	0	0	0	0	0	0	0
2	TOILETS, KITCHEN	1	1	3,520	3,520	0	0	0	0	0	21	11	174
Zone	2 Total/Ave.				3,520	0	0	0	0	0	21	11	174
- 11	TOILETS W ROOF	1	1	580	580	0	0	0	0	580	0	0	0
Zone	<pre>11 Total/Ave.</pre>				580	0	0	0	0	580	0	0	0
System	<pre>2 Total/Ave.</pre>				4,100	0	0	0	0	580	21	11	174
3	STAIRS	1	1	560	560	0	0	0	0	0	255	29	625
Zone	3 Total/Ave.				560	0	0	0	0	0	255	29	625
5	1ST FL OFFICES	1	1	11,724	11,724	0	0	0	0	0	1,573	19	6,530
Zone	5 Total/Ave.				11,724	0	0	0	0	0	1,573	19	6,530
7	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	0	0	1,610	17	7,730
Zone	7 Total/Ave.				14,400	0	0	0	0	0	1,610	17	7,730
9	3RD FL OFFICES	1	1	14,400	14,400	0	0	0	0	14,400	1,610	17	8,010
Ione	9 Total/Ave.				14,400	0	0	0	0	14,400	1,610	17	8,010
12	STAIRS W ROOF	1	1	280	280	0	0	0	0	280	105	25	307
Zone	12 Total/Ave.				280	0	0	0	0	280	105	25	307
System	3 Total/Ave.				41,364	0	0	0	0	14,680	5,152	18	23,202
13	SUPPLY STORAGE	1	1	2,544	2,544	1,632	0	0	0	0	0	0	0
Zone	13 Total/Ave.				2,544	1,632	0	0	0	0	0	0	0
System	4 Total/Ave.				2,544	1,632	0	. 0	0	0	0	0	0
6	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	6 Total/Ave.				9,884	0	0	0	0	0	250	19	1,038
8	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	55
Zone	<pre>8 Total/Ave.</pre>				8,674	0	0	0	0	0	105	66	<b>5</b> 5
10	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	<pre>10 Total/Ave.</pre>				8,563	0	. 0	0	0	8,563	105	64	60
System	5 Total/Ave.				27,121	0	0	0	0	8,563	460	29	1,153
14	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	<pre>14 Total/Ave.</pre>				9,884	0	0	0	0	0	250	19	1,038
15	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	<b>5</b> 5
Zone	<pre>15 Total/Ave.</pre>				8,674	0	0	0	0	0	105	66	<b>5</b> 5
16	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	<pre>16 Total/Ave.</pre>				8,563	0	0	0	0	8,563	105	64	60
System	6 Total/Ave.				27,121	0	0	0	0	8,563	460	29	1,153
Buildin	g				159,799	18,202	0	0	0	32,386	6,095	19	25,681

ASHRAE 90 ANALYSIS - ALTERNATIVE 2 DOUBLE GLAZED WINDOWS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.313 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.199 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 21.90 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 BOUBLE GLAZED WINDOWS

#### System Totals

Percent	Cool	ing Loa	id	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design Load	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
,												
0 - 5	17.4	0	0	-186,616	16	190	6,541.3	0	0	0.0	0	0
5 <b>-</b> 10	34.7	0	0	-373,231	4	44	13,082.7	0	0	0.0	0	0
10 - 15	52.1	7	80	-559,847	- 10	121	19,624.1	0	0	0.0	0	0
15 - 20	69.4	9	96	-746,463	3	40	26,165.4	0	0	0.0	0	0
20 - 25	86.8	6	64	-933,078	5	65	32,706.7	0	0	0.0	0	0
25 - 30	104.1	3	36	-1,119,694	7	83	39,248.1	0	0	0.0	0	0
30 - 35	121.5	17	186	-1,306,310	7	82	45,789.5	0	0	0.0	0	0
35 - 40	138.8	14	155	-1,492,926	30	366	52,330.8	0	0	0.0	0	0
40 - 45	156.2	9	91	-1,679,541	16	191	58,872.2	0	0	0.0	0	0
45 - 50	173.5	5	53	-1,866,157	3	41	65,413.5	0	0	0.0	0	0
<b>50 -</b> 55	190.9	6	64	-2,052,773	0	0	71,954.9	0	0	0.0	0	0
55 - 60	208.2	2	22	-2,239,388	0	0	78,496.2	0	0	0.0	0	0
60 - 65	225.6	2	23	-2,426,004	0	0	85,037.6	0	0	0.0	0	0
<b>65 -</b> 70	242.9	7	75	-2,612,620	0	0	91,578.9	0	0	0.0	0	0
70 - 75	260.3	7	80	-2,799,236	0	0	98,120.3	0	0	0.0	0	0
75 - 80	277.7	3	35	-2,985,851	0	0	104,661.6	0	0	0.0	0	0
80 - 85	295.0	1	10	-3,172,467	0	0	111,203.0	0	0	0.0	0	0
85 - 90	312.4	0	0	-3,359,083	0	0	117,744.3	100	2,520	0.0	0	0
90 - 95	329.7	0	0	-3,545,699	0	0	124,285.7	0	0	0.0	0	0
95 - 100	347.1	0	0	-3,732,314	0	0	130,827.0	0	0	0.0	0	0
Hours Off	0.0	0	7,690	0	0	7,537	0.0	0	6,240	0.0	0	8,760

## BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2 BOUBLE GLAZED WINDOWS

					RUI	LDI	N G	TFM	PER	Δ T II	R F P	RNF	I I F	s			
Tamporatura														Ū			
Temperature Range	1	4	2	11	3	5		9	12				10	14	15	16	
(F)	•	,	-	11	U	J	,	,	12	10	Ū	Ū	10	17	13	10	
Max. Temp.	82.6	81.5	209.9	120.2	86.6	85.0	84.8	83.4	85.6	96.2	85.3	89.0	84.5	85.3	89.0	84.5	
Mo./Hr.	10 21							7 21	7 22	8 17		10 4	7 6		10 4	7 6	
Day Type	2	2	2	2	4	1	!	4	1	2	5	2	5	5	2	5	
									Nur	mber o	f Hour:	5					
Above 100	0	0	8,016	4,086	0	0	. 0	0			0		0	0	0	0	*****************
95 - 100	0			110		0	0	0	0	240	0	0	0	0	0	Ŏ	
90 - 95	0	0	162	1,239			0	0		1,494			0	0	0	0	
85 - 90	0	0					0	0		1,602	30	744	0	30	664	0	
80 - 85	954	517	215	585	1,221	1,271	1,220	804	1,200	1,215	2,044	3,664	1,616	2,044	3,611	1,616	
75 - 80	5,027	2,814	102													3,803	
70 - 75	1,202	3,711	0				656			1,435						1,289	
65 - 70	1,418	1,516	0	726	1,570	1,513	1,493	1,612	1,514	1,579	1,141	0	1,438	1,186	12	1,386	
60 - 65	159	202	0	178	1,132	1,147	1,205	1,409	1,295	377	421	0	453	466	0	509	
55 - 60	0	-	_		838	872	855	746	957	0	330	0	121	340	. 0	157	
50 - 55	0			0	659	543	519	428	548	0	241	0	0	256	0	0	
Below 50	0	0	0	0	855	793	796	553	723	0	0	0	0	0	0	0	
Min. Temp.	63.8	63.0	68.1	63.6	35.3	35,8	35.9	38.8	36.9	61.7	51.9	68.0	58.3	51.6	68.0	58.0	
Mo./Hr.		1 10			2 7	2 7	2 7	2 7	2 7	1 6	2 7	1 1	1 7	2 7	1 1	1 7	•
Day Type	5	5	1	5	5	5	5	5	5	5	5	1	5	5	1	5	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2 DOUBLE GLAZED WINDOWS

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	STEAM On Peak (Therm)	WATER (1000 Gl)	STEAM DMND On Peak (Thrm/hr)
Jan	163,358	813	10,933	0	65
Feb	147,800	813	10,358	0	65
March	178,338	813	7,721	0	58
April	148,713	813	1,579	0	41
May	191,368	947	0	73	0
June	198,133	1,011	0	- 118	0
July	196,371	1,060	0	192	0
Aug	208,413	1,018	0	130	0
Sept	174,456	974	0	69	0
Oct	160,617	813	810	0	40
Nov	151,428	813	3,728	0	52
Dec	155,579	813	9,096	0	63
Total	2,074,575	1,060	44,225	582	65

Building Energy Consumption = 71,984 (Btu/Sq Ft/Year)
Source Energy Consumption = 169,840 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 DOUBLE GLAZED WINDOWS

----- EQUIPMENT ENERGY CONSUMPTION ------

	Equip						-	sumption						
Num	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS	70017	71707	07.400	35155	00/71	00/76	75455	0/100	75155	00/71	70400	75455	044 054
	ELEC PK	78913 410.7	71397 410.7	86428 410.7	75155 410.7	82671 410.7	82671 410.7	75155 410.7	86428 <b>4</b> 10.7	75155 410.7	82671 410.7	75155 410.7	75155 410.7	946,954 410.7
1	MISC LD													
	ELEC	. 0	0	0	0	- 0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	• • • • • • • • • • • • • • • • • • • •
2	MISC LD			•		•	•						•	
	GAS PK	0.0	0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0.0	0.0	0.0	0 0.0	0 0.0	0 0.0
		0.0		V.V	V.V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	V.V
3	MISC LD OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
·	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	. 0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MISC LD P CHILL	. ^	0	۸	۸	٥	۸	۸	^	۸	۸	^	۸	۸
	<b>b</b> X	0.0	0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0
						• • • • • • • • • • • • • • • • • • • •			•••	•			•••	•••
. 1	EQ1001S ELEC	0	2-S 0	TG CTV <br O	555 TONS 0	13952	20718	35085	22933	13170	0	٨	0	105,857
	PK	0.0	0.0	0.0	0.0	106.1	169.5	218.7	176.8	132.9	0.0	0.0	0.0	218.7
100	EQ5100		cno	LING TOW										
	ELEC	0	0	0	0	5115	5115	4650	5348	4650	0	0	0	24,878
	PK	0.0	0.0	0.0	0.0	23.3	23.3	23.3	23.3	23.3	0.0	0.0	0.0	23.3
1	EQ5100		000	LING TOW	ER									
	WATER	0	0	0	0	73	118	192	130	69	0	0	0	582
	PK	0.0	0.0	0.0	0.0	0.6	0.9	1.1	1.0	0.8	0.0	0.0	0.0	1.1
1	EQ5001			LLED WAT								_		
	ELEC	0.0	0 0.0	0 0.0	0 0.0	6562 29.8	6562 29.8	5966	6860 <b>2</b> 9.8	5966 29.8	0 0.0	0.0	0 0.0	31,916 29.8
	PK	V.U					47.0	29.8	27.5	۷۶.۵	0.0	0.0	٧.٧	27.0
1	EQ5010	•		DENSER W			1515	***	1515	£5.77		^	^	71 011
	ELEC PK	0 0.0	0 0.0	0.0	0.0	6562 29.8	6562 29.8	5966 29.8	6860 <b>29.</b> 8	5966 <b>2</b> 9.8	0.0	0.0	0 0.0	31,916 29.8
1	EQ5300		СПИ	TROL PAN	FI & TNT	ERL DCK								
•	243000		OUN	[11]	~ 4111									

1 EQ5020

HEAT WATER CIRC. PUMP C.V.

# EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 DOUBLE GLAZED WINDOWS

	JEE GENTED	111100110												·
	ELEC PK	0.0	0.0	0.0	0.0	220 1.0	220 1.0	200 1.0	230 1.0	200 1.0	0.0	0.0	0.0	1,070 1.0
2	EQ1000		PRI	EVENTS CO	OLING EN	FRGY								
_	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	ÞΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5001		CH	ILLED WAT	ER PUMP (	C.V.								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5010		CO		IATER PUMF	C.V.								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	ÞΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ~	.0.0	0.0
1	EQ4003		FC	CENTRIF.	FAN C.V.	•								
	ELEC	9754	8825	10683	9290	10219	10219	9290	10683	9290	10219	9290	9290	117,051
	PK	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4
1	EQ4003				FAN C.V.									
	ELEC	2276	2059	2493	2168	2384	2384	2168	2493	2168	2384	2168	2168	27,312
	ÞΚ	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
2	EQ4003		FC	CENTRIF.	FAN C.V.	i								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	13975	12644	15305	13309	14640	14640	13309	15305	13309	14640	13309	13309	167,695
	PK	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5
3	EQ4003				FAN C.V.	•								
arita Barita	ELEC	1747	1580	1913	1664	1830	1830	1664	1913	1664	1830	1664	1664	20,962
	PK	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
5	EQ4003		FC	CENTRIF.	FAN C.V.									
4,10,	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	19076	240,355
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
5	EQ4003		FC	CENTRIF.	FAN C.V.	,								
	ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	30,044
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
6	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	19076	240,355
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
6	EQ4003				FAN C.V.									
	ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	30,044
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
1	EQ2101		PU	RCHASED D	ISTRICT S	STEAM								
	P STEAM	1874	1775	1323	271	0	0	0	0	0	139	636	1559	7,578
	PK	11.2	11.2	10.0	7.0	0.0	0.0	0.0	0.0	0.0	6.8	8.9	10.9	11.2

	ne Air Condi Trane Custo			Network										V 600 Page 37
EQU.	IPMENT ENERG BLE GLAZED W		TION - AL	TERNATIV	E 2									
	ELEC PK	6264 29.8	5667 29.8	6294 29.8	2267 29.8	0.0	0.0	0.0	0.0	0.0	895 29.8	3460 29.8	5966 29.8	30,812 29.8
1	EQ5061		COND	ENSATE R	ETURN PUI	ηp								
	PK ELEC	117 0.6	106 0.6	118 0.6	42 0.6	0.0	0.0	0.0	0.0	0.0	17 0.6	65 0.6	112 0.6	576 0.6
2	EQ2101		PURC	HASED DI	STRICT S	TFAM								
-	P STEAM	9060	8583	6397	1307	0	0	0	0	0	671	3092	7537	36,647
	PK	53.9	53.9	48.1	33.9	0.0	0.0	0.0	0.0	0.0	32.7	42.8	52.6	53.9
2	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
•	ELEC	5220	4723	5717	1889	- 0	0	0	0	0	746	3381	4971	26,646
	PK	24.9	24.9	24.9	24.9	0.0	0.0	0.0	0.0	0.0	24.9	24.9	24.9	24.9
2	EQ5061		COND	ENSATE R	ETURN PU	¶P								
	ELEC	26	23	28	9	0	0	0	0	0	4	17	25	132
	PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
3	EQ2000		PREV	ENT SUM	OF HEAT	ENERGY								.*
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	0	` 0	0	0	0	0	0	0	0	0	0	0	. 0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2
DOUBLE GLAZED WINDOWS

-----UTILITY PEAK CHECKSUMS-----

Utility	ELECTRIC	DEMAND
---------	----------	--------

Peak Value 1,060.0 (kW)
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

Eqp. Ref. Num.	Equipment Code Name			Equipment	Description	Utility Demand (kW)		
Cooling E	quipment							
1	EQ1001S	2-STG CTV	<555 T	ONS		302.6	28.55	
Sub Total						302.6	28.55	
Sub Total						0.0	0.00	
Air Movin	g Equipment							
1 3 5 6		SUMMATION SUMMATION	OF FAN	ELECTRICAL ELECTRICAL ELECTRICAL ELECTRICAL	DEMAND DEMAND	57.3 74.9 107.3 107.3	7.06 10.12	
Sub Total						346.8	32.71	
Sub Total						0.0	0.00	
Lights Base Uti Misc Equ Sub Total	ipment					410.7 0.0 0.0 410.7		
Grand Tot	al					1,060.0	100.00	

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 122

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density:

Air Specific Heat:

Density-Specific Heat Prod:
Latent Heat Factor:

Enthalpy Factor:

0.0742 (Lbm/cuft)

0.2444 (Btu/lbm/F)

1.0882 (Btu-min./hr/cuft/F)

4,790.2 (8tu-min./hr/cuft)

4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 9: 7: 3 2/2/94 Dataset Name: CB122 .TM

AIRFLOW - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

			~~~~~~~~~	Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	TRH	10,853	36,175	<b>3</b> 6,175	36,175	10,853	0	0
2	SI	0	17,730	17,730	17,730	0	0	17,730
3	INDFP	5,830	19,435	19,435	34,746	19,435	35,846	. 0
4	UH	0	0	1,835	0	0	0	0
5	DD ·	8,363	27,876	27,876	- 28,747	27,876	0	0
6	DD	8,357	27,856	27,856	28,727	9,228	0	0
Totals		33,403	129,072	130,907	146,125	67,391	35,846	17,730

CAPACITY - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Compan

			Coo	ling					Heating			
System Number	-	Capacity		Opt. Vent Capacity (Tons)	Cooling Totals (Tons)		Aux. Sys. Capacity (8tuh)	Preheat Capacity (Btuh)	Reheat Capacity (8tuh)	Humidif.	Opt. Vent Capacity (8tuh)	Heating Totals (Btuh)
. i	TRH	81.5	0.0	0.0	81.5	-68,182	0	-480,162	0	0	0	-548,345
. 2	! SZ	3.2	0.0	0.0	3.2	-9,837	0	-106,277	0	0	0	-9,837
3	INDFP	46.4	95.1	0.0	141.5	-680,963	-1,112,457	0	0	0	0	
4	UH	- 0.0	0.0	0.0	0.0	-6,715	0	0	0	0	0	-6,715
	DD	62.8	0.0	0.0	62.8	-441,147	0	-367,097	0	0	0	-808,244
6	DD	62.8	0.0	0.0	62.8	-230,501	0	-366,647	0	0	0	-597,149
Totals		256.8	95.1	0.0	351.9	-1,437,345	-1,112,457	-1,320,184	0	0	0	-3,763,708

The building peaked at hour 14 month 7 with a capacity of 256.7 tons

ENGINEERING CHECKS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

ENGINEERING CHECKS

			Percent	~~~~~	Coo	ling		Heat	ing	
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	8tuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Туре	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	TRH	30.00	0.63	<b>4</b> 43.7	705.9	17.00	0.63	-9.53	57,549
2	Main	SI	0.00	4.32	5,605.2	1,296.2	9.26	4.32	-2.40	4,100
3	Main	INDFP	30.00	0.47	418.7	891.2	13.46	0.47	-16.46	41,364
3	Auxiliary	IMDEP	0.00	0.87	376.9	434.9	27.59	0.87	-26.89	41,364
4	Main	UX	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	443.7	431.6	27.80	1.03	-29.80	27,121
6	Main	DD	30.00	1.03	-443.5	431.8	27.79	1.03	-22.02	27,121

System 1 Peak TRH - TERMINAL REHEAT

******* Peaked a			COOLING COI	L PEAK ****	*******	******	**** *			PEAK **** 7/16 · *			)IL PEAK : 13/1	******
Outside				91/ 74/105.	0		*		/ 11 . ADB: '			OADE		
				, , ,			*	_		*	:	3.,5	,	$\frac{1}{2} = \frac{4}{2}$
		Space	Ret. Ai	r Ret. Air	Net	Percni	*	S	pace	Percnt *	Space F	eak Co	il Peak	Percnt
•		Sens.+Lat.	Sensible	e Latent	Total	Of Tot	*	Sens	ible	Of Tot *	Space S	Sens 1	ot Sens	Of Tot
Envelope		(Btuh)	(Btuh)	) (Btuh)	(Btuh)	(%)	*	(B	tuh)	(%) *	(B1	tuh)	(Btuh)	(\$)
Skylit		0	(	)	0	0.00	*		0	0.00 *		0	0	0.00
Skylit		0	(	)	0	0.00	*		0	0.00 *		0	0	0.00
Roof C	ond	0	(	)	0	0.00	*		0	0.00 *		0	0	0.00
Glass		0	(	)	0	0.00	*		0	0.00 *		0	0	0.00
Glass		0	(	)	0	0.00	*		0	0.00 *		0	0	0.00
Wall C		0	(	)	0	0.00	*		0	0.00 *		0	. 0	0.00
Partit		18,940			-18,940	1.94	. *	18	,940	4.00 *	-68,	182	-68,182	100.00
	d Floor	0			0	0.00	*		0	0.00 *	•	0	0	0.00
Infilt		0			0	0.00	*		0	0.00 *		0	0	0.00
Sub To		18,940	(	)	18,940	1.94	*	18	,940	4.00 *	-68,	182	-68,182	100.00
Internal							#			*				
Lights		398,781	(	)	398,781				,020	89.45 *		0	0	0.00
People		63,941			63,941			31	,097	6.56 *		0	0	0.00
Misc		0	(	) 0	0				0	0.00 *		0	0	0.00
Sub To		462,722	(	•	462,722			455	,117	96.00 *		0	0	0.00
Ceiling		0	(		0				0	0.00 *		0	. 0	0.00
Outside (		0	(	) 0	406,913				0	0.00 *		0	0	0.00
Sup. Fan					77,173					0.00 *			. 0	0.00
Ret. Fan			18,007		18,007					0.00 *			0	0.00
Duct Hea			(	)	0					0.00 *			0	0.00
OV/UNDR	_	0			0	• • • • •			0	-0.00 *		0	0	0.00
Exhaust			-5,402		-5,402					0.00 *			0	0.00
Terminal	Bypass		(	) 0	0	0.00	*			0.00 *			0	0.00
							*			*				
Grand lo	tal==>	481,661	12,605	j 0	978,353	100.00	*	474	,057	100.00 *	-68,	182	-68,182	100.00
-				LING COIL S										
				Coil Airfl				Leav			Gross To		Glass (s	f) (%)
Main Clg	(Tons)		(Mbh)	(cfm)	-				_	Grains	Floor	57,549		
Aux Clg	81.9		719.6	36,175			3.9	61.0	59.3	74.8	Part	16,570		
Opt Vent	0.0		0.0	0			0.0	0.0	0.0	0.0	Exflr	0		
Totals	81.5		0.0	V	0.0	0.0	0.0	0.0	0.0	0.0	Roof	0		0 0
,(ULG13	01.5	710.4									Wall	0		0 0
	HFATI	NC COTE SEL	ECTION		AT	מבוחשפ (	cfm).		(	ENGINEERING	CHECKG.	TEN	DEDATURE	0 (5)
			irfl Ent			Cooling		Heating		ingineening 3 % OA			PERATURE	
	(Mbh		m) Deg F		Vent	_		nearing 0	•	з % он g Cfm/Sqft		Typ	_	_
Main Htg	-68		175 68.0	-	Infil	10,033		0	•	g Cfm/3qri g Cfm/Ton		SADB		
Aux Htg	0				Supply	36 175		36,175		Sqft/Ton		Plenu		
Preheat	-480		175 48.8		Minefm	36,175		00,173		; Sqrt/Ton ; Btuh/Sqft		Retur		
Reheat	-0		0 0.0		Return	36,175		36,175	NV 016	, ecunysqii . People		Ret/O		
Humidif	C		0 0.0			10,853				. People ] % OA	137	Runar		
								0	n e ç			Fn Mt		
			v v.0	V.V										
	310				HUNII	U		V	1167	y Deally Date	7.30	111 71	100 1.	1 1.1
Opt Vent Total	-548		0 0.0	0.0	Rm Exh Auxil	0		0	Htg	g Cfm/SqFt g Btuh/SqFt	0.63	Fn 81 Fn Fr		

Trane Air Conditioning Economics

By: Trane Customer Direct Service Network

System 2 Peak SZ - SINGLE ZONE

******	********	****** C(	DOLING COIL	PEAK *****	*******	******	***	**** CLG	SPACE	PEAK *****	***** HEAT	ING COIL	PEAK *	*****
Peaked at	: Time ==>		Mo/Hr: 7	/16			*	Mo/	Hr: 7	/16 *		Mo/Hr: 1	3/1	
Outside A	ir ==>	0.41	DB/WB/HR: 9	1/ 73/ 98.0	)		*	OA	D8: 9	1 *		OADB:	4	
Agr.							*			*				•
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Sp	ace	Percnt *	Space Pea	k Coil	Peak	Percnt
Flagi	Ser	ns.+Lat.	Sensible	Latent	Total	Of Tot	*	Sensi	ble	Of Tot *	Space Ser	s Tot	Sens	Of Tot
- Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	*	(Bt	uh)	(%) *	(Btuh	n) (B	tuh)	(%)
Skylite	Solr	0	0		0	0.00	*		0	0.00 *		0	0	0.00
Skylite	Cond	0	0		0	0.00	*		0	0.00 *		0	0	0.00
Roof Co		0			860	2.26	*		0	0.00 *		0 -3	, 224	44.57
Glass S	Solar	595	0		595	1.57	*		595	1.71 *		0 -3 0	0	0.00
Glass C	Cond	239	0		239	0.63	¥		239	0.69 *	-1,13	59 -1	,139	15.75
Wall Co	ond	747	183		929	2.45	*		747	2.14 *			,870	39.68
Partiti		0		;	- 0	0.00	*		0	0.00 *		0	0	0.00
Exposed		0			. 0	0.00	*		0	0.00 *			0	0.00
Infiltr		0			0	0.00			0	0.00 *		_	0	0.00
Sub Tot			1,042		2,623			1,	581		-3,42		,234	100.00
Internal		,	-,*		-,		*	-,		*	- 1 / -	·		
Lights		30,623	0		30,623	80.68	*	30.	623	87.96 *		0	0	0.00
People		4,712			4,712			2,		6.38 *		0	0	0.00
Misc		0		0	0				0	0.00 *		0	0	0.00
	(al==>		0		35,335				845	94.34 *		0	0	0.00
			-1,918	•	0	0.00			389	1.12 *		13	0	0.00
Outside A		0		0	0	0.00			0	0.00 *		0	0	0.00
Sup. Fan		•	·	•	0	0.00				0.00 *			0	0.00
Ret. Fan			0		0	0.00				0.00 *			0	0.00
Duct Heat			0		0	0.00				0.00 *			0	0.00
OV/UNDR S	•	0	-		0	-0.00			0	-0.00 *	-	0	Ó	-0.00
Exhaust h	_	v	0	0	0				•	0.00 *		•	0	0.00
Terminal			0	0	0					0.00 *			0	0.00
101 11111111111	0) 0433		v	•	·		*			*			•	•••
Grand Int	talii>	38 834	-876	0	37.958	100.00	*	34.	815	100.00 *	-3.66	68 <b>-</b> 7	.234	100.00
		,,	0.0	•	2.,,,	2		,			•,•		,	
			cool	ING COIL SE	ELECTION							AREAS-		
			Sens Cap.											
Maria Santa			(Mbh)								Floor		,,,	, , , , , ,
Main Clg		38.0			76.6 68			73.2			Part	0		
			0.0									0		
Opt Vent	0.0	0.0	0.0	Ö			0.0	0.0	0.0	0.0	Roof	580		0 0
Totals	3.2	38.0		•							Wall	196		21 11
	,	. ,,										•		
	HEATING	COIL SEL	ECTION		AI	RFLOWS (	cfm)		8	NGINEERING	CHECKS	TEMPER	ATURES	S (F)
ober striff Striffe	Capacity				Type	Cooling		Heating	Clo	3 % OA	0.0	Type	Clg	
	(Mbh)	(cf		Deg F	Vent	Õ		0		Cfm/Sqft	4.32	SADB	73.1	_
Main Htg	-9.8		-	68.2	Infil	0		0		cfm/Ton	5605.16	Plenum	76.	
Aux Htg	0.0		0.0	0.0	Supply	17,730		17,730		Sqft/Ton	1296.17	Return	79.	
Preheat	-106.3			73.2	Mincfm	0		0		Btuh/Sqft		Ret/OA	76.	
Reheat	0.0		0 0.0	0.0	Return	0		17,730		. People	10	Runarnd	75.	
Humidif	0.0		0.0	0.0	Exhaust	0		0		3 % OA	0.0	Fn MtrTC		
Opt Vent	0.0		0.0	0.0	Rm Exh	17,730		0		g Cfm/SqFt	4.32	Fn BldTC		
Total	-9.8		- 410	V. V	Auxil	0		0		g Btuh/SqFt		Fn Frict		
10001	<i>,</i> .0				.,	·		·		,, <del>-</del> -, •			••	. •••

System 3 Block INDFP - 4-PIPE INDUCTION

<b>***</b> ********	*****	COOLING COIL	PEAK ****	*******	******	***** CLG	SPACE	PEAK ****	***** HEAT	: ING COIL PE	AK ******
Peaked at Tim	e ::>	Mo/Hr:	7/14				/Hr: 7			Mo/Hr: 13/	
Outside Air =	=> (	DAD8/WB/HR:	91/ 74/105.0	)		* 04	AD8: 8	<b>*</b>		OADB: 4	
						*		*			
	Space	e Ret. Air	Ret. Air	Net	Percnt	* Sp	oace	Percnt *	Space Pea	k Coil Pe	ak Percnt
	Sens.+Lat	Sensible	Latent	Total	Of Tot	* Sensi	ible	Of Tot *	Space Sen	s Tot Se	ns Of Tot
Envelope Load	s (Btuh	(Btuh)	(Btuh)	(8tuh)	(%)	* (Bt	tuh)	(%) *	(8tuh	) (Btu	h) ( <b>%</b> ( <b>%</b> )
Skylite Sol	r (	) 0		0	0.00	*	0	0.00 *		0	0 0.00
Skylite Con	d (	0		0	0.00	*	0	0.00 *		0	0 0.00
Roof Cond	474	21,484		21,957	1.27	*	664	0.10 *	-1,57	9 -73,4	46 4.10
Glass Solar	171,927	0		171,927	9.94	* 185,	822	28.22 *			0 0.00
Glass Cond	53,830	) 0		53,830	3.11	* 40,	082	6.09 *	-276,28	7 -276,2	1
Wall Cond	113,330	16,902		130,232				25.66 *	•		
Partition	(			- 0			0	0.00 *		0	
Exposed Floa	or (	)		0			0	0.00 *		0	
Infiltratio	n 662,719	)		662,719			520	23.31 *		- 7 -1,066,3	1
Sub Total==						•	065	83.38 *		0 -1,793,4	
Internal Loads		,		-, ,				*	2,0.2,0.	2,,,,,,	100.00
Lights	277,628	3 0		277,628	16.06	<b>*</b> 79.	744	12.11 *		0	0 0.00
People	45,248			45,248				0.92 *		0	0 0.00
Misc	, (		0	0		,	0	0.00 *		0	0.00
Sub Total==:	322,876		0	322,876			814	13.03 *		0	0.00
Ceiling Load				0			486	3.57 *		•	0 0.00
<b>O</b> utside Air				252,361			0	0.00 *	•	0	0.00
Sup. Fan Heat		_	-	110,564			•	0.00 *		•	0 0.00
Ret. Fan Heat		13,820		13,820				0.00 *			0 0.00
Duct Heat Pku	)	0		0				0.00 *			0 0.00
OV/UNDR Sizing				119			119	0.02 *		0	0 0.00
Exhaust Heat	-	-11,266	0	-11,266			**/	0.00 *		V	0 0.00
Terminal Bypas		0		0				0.00 *			0 0.00
,,,,			•	·		*		*			· • • • • • • • • • • • • • • • • • • •
Grand Total==:	1,339,929	26,287	0	1,729,140	100.00	* 658,	484	100.00 *	-1,720,45	1 -1.793.4	20 100.00
		C00I									
		Sens Cap.					-				(sf) (%)
(Toi		(Mbh)		Deg F Deg			-	Grains	Floor 4	1,364	
	5.4 557.0		19,435		5.7 78.0		57.7		Part	0	
	5.1 1,141.4			75.0 63			53.1	42.6		0	
Opt Vent (			0	0.0	0.0	0.0	0.0	0.0	Roof 1		0 0
Totals 14	1.5 1,698.3								Wall 2	B,354	5,152 18
ur	ATTHE COTE OF	LCATION		A T.C	151 0HO / - F	. 1	_		01150110		/->
		LECTION	1	A16						TEMPERATI	
	acity Coil 1bh) (c		Lvg		Cooling	Heating	Cig	% OA	30.0		Clg Htg
·		•	Deg F	Vent	5,830	0	Clg	Cfm/Sqft			55.1 96.7
Main Htg - (				Infil	10,311	15,311		Cfm/Ton			76.1 64.4
Aux Htg -1,1						19,435	_	Sqft/Ton			76.8 64.5
		,435 64.5		Mincfm	0	0		Btuh/Sqft			30.9 64.5
Reheat		0 0.0			19,435	19,435	No.	People	98		75.0 68.0
Humidif					5,830	0	Htg	% OA Cfm/SqFt	0.0		1.3 1.3
		0 0.0		Rm Exh	0						1.0 1.0
Total -1,7	193.4			Auxil	35,846	35,846	Htg	8tuh/Sqft	-16.46	Fn Frict	2.9 2.5

System 4 Block UH - UNIT HEATERS

******	*******	****** C	OOLING COIL	PEAK ****	*******	******	***** CLG	SPACE	PEAK ****	***** HEATI	NG COIL PEAK	******
	t Time ==>		Mo/Hr: (						/ 0 *		Mo/Hr: 13/ 1	
Outside	Air ==>	0A	DB/W3/HR:	0/ 0/ 0.	0		* 0	ADB:	0 *		OADB: 4	1
							*		*			- 1.
		Space		Ret. Air		Parcnt		pace	Percnt *	Space Peak	Coil Peak	Percnt
	Sen	s.+Lat.	Sensible	Latent	Total	Of Tot			Of Tot *	Space Sens	Tot Sens	Of Tot
Envelope		(8tuh)	(Btuh)	(Btuh)	(Btuh)	(%)		tuh)	(%) *	(Btuh)	(Btuh)	(%)
Skylit		0	0		0	0.00		0	0.00 *	0	0	0.00
•	e Cond	0	0		0	0.00		0	0.00 *	0	0	0.00
Roof C		0	0		0	0.00		0	0.00 *	0	0	0.00
Glass		0	0		0	0.00		0	0.00 *	0	0	0.00
Glass		0	0		0	0.00		0	0.00 *	0	0	0.00
Wall C		0	0		0	0.00		0	0.00 *	0	•	0.00
Partit		0			- 0	0.00		0	0.00 *	-6,715	-6,715	100.00
	d Floor	0			0	0.00		0	0.00 *	0	0	0.00
Infilt		0			0	0.00		0	0.00 *	0	0	0.00
Sub To		0	0		0	0.00	*	0	0.00 *	-6,715	-6,715	100.00
Internal							*		*			
Lights		0	0		0	0.00		0	0.00 *	0	0	0.00
People		0			0	0.00	*	0	0.00 *	0	0	
Misc		0	0	0	0	0.00	*	0	0.00 *	0	0	0.00
Sub To		0	0	0	0	0.00	t	0	0.00 *	0	0	
Ceiling		0	0		0	0.00	*	0	0.00 *	0	0	0.00
Outside		0	0	0	0	0.00	*	0	0.00 *	0	0	0.00
Sup. Fan	Heat				0	0.00			0.00 *		0	0.00
Ret. Fan			0		0	0.00	*		0.00 *		0	0.00
Duct Hea			0		0	0.00	*		0.00 *	•	0	0.00
OV/UNDR	-	0			0	0.00	*	0	0.00 *	0	0	0.00
Exhaust			0	0	0	0.00	*		0.00 *		0	0.00
Terminal	Bypass		0	0	0	0.00	*		0.00 *		0	0.00
							*		*			
Grand To	tal::>	0	0	0	0	0.00	*	0	0.00 *	-6,715	-6,715	100.00
					ELECTION						AREAS	
	Total Ca		Sens Cap.			ng DB/WB/1				Gross Total	Glass (	sf) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De			_	Grains		,544	
Main Clg	0.0	0.0	0.0	0			.0 0.0	0.0	0.0		,632	
Aux Clg	0.0	0.0	0.0	0			.0 0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	.0 0.0	0.0	0.0	Roof	0	0 0
Totals	0.0	0.0								Wall	0	0 0
	.,,,,,,,,,	AAT! AT!	CATTOU				- \					
					AI				NGINEERING		TEMPERATUR	
	Capacity					Cooling	Heating	_	% OA	0.0		g Htg
16.5 M. • D.	(Mbh)	(cfi		•	Vent	0	0		Cfm/Sqft			.0 71.4
Main Htg	-6.7	1,			Infil	0	0		Cfm/Ton			.0 68.0
Aux Htg	0.0		0 0.0	0.0	Supply	0	1,835		Sqft/Ton			.0 68.0
Preheat	0.0		0 0.0	0.0	Mincfm	0	0		Btuh/Sqft			.0 68.0
Reheat	0.0		0 0.0	0.0	Return	0	1,835		People			.0 68.0
Humidif	0.0		0.0	0.0	Exhaust	0	0	_	% OA			.0 0.0
Opt Vent	0.0		0 0.0	0.0	Rm Exh	0	0	_	Cfm/SqFt			.0 0.0
Total	-6.7				Auxil	0	0	Htg	Btuh/SqFt	-2.64	Fn Frict 0	.1 0.0

System 5 Block DD - DOUBLE DUCT

******	******	******** C	OOLING COIL	PEAK ****	********	******	:***** CLG	SPACE	PEAK ****	****** HEAT	ING COIL PE	EAK ******
Peaked a	t Time =	=>	Mo/Hr:	7/14			* Mo,	Hr:	7/16 *		Mo/Hr: 13/	/ 1
Outside	Air ==>	A0	DB/WB/HR:	91/ 74/105.	0		* 0/	1D8:	91 *		0AD8: 4	
		Space	Ret. Air	Ret. Air	Net	Percnt	* S;	ace	Percnt *	Space Pea	k Coil Pe	eak Percnt
	;	Sens.+Lat.			Total	Of Tot	* Sensi		Of Tot *	· · · · · · · · · · · · · · · · · · ·		
Envelope		(Btuh)	(Btuh)	(Btuh)				tuh)	(%) *		) (Btu	
Skylit	e Solr	0			0	0.00	*	0	0.00 *		0	0 0.00
Skylit	e Cond		0		0	0.00	*	0	0.00 *		0	0 0.00
Roof Co	ond	14,486	0		14,486	1.92	* 16,	221	5.79 *	-48,28	6 -48,2	286 22.76
Glass	Solar	17,909 4,840	0		17,909			285	5.81 *			<b>I</b>
		4,840	0		4,840				1.84 *		0 -24,6	<b>I</b>
Wall C			526		4,687				2.01 *			
	ion	0			- 0	0.00	*	0	0.00 *		0	0 0.00
	d Floor	0			0		*	0			0	0.00
Infilt		29,955				3.97				-60,66		
Sub To		71,351	526		/1,8//	9.53		987	20.68 *	-150,31	5 -152,5	560 71.91
Internal Lights		190,447	۸		100 447	25.24		0.70	*			
People		30,203			190,447 30,203				71.63 *		0	0 0.00
Misc		30,203	0	0	39,293			0	5.21 * 0.00 *		0	0.00
Sub To	tal::>		0	0	220,650				76.84 *		0	0 0.00
		1,374			0		,		0.55 *		•	0 0.00
		0			287,603				0.00 *	,		0 0.00
Sup. Fan			_	•	158,583			•	0.00 *		v	0 0.00
Ret. Fan			19,823		19,823				0.00 *			0 0.00
Duct Hea	t Pkup		0			0.00			0.00 *			0 0.00
OV/UNDR	Sizing	5,387			5,387	0.71	* 5,	387	1.92 *	-59,59	2 ~59,5	I
Exhaust	Heat		-9,939		-9,939				0.00 *		,	0 0.00
Terminal	Bypass		Û	0	0	-0.00	*		0.00 *			0 0.00
5*							*		*			
Grand To	tal==>	298,761	9,036	C	753,984	100.00	* 280,	377	100.00 *	-214,53	2 ~212,1	152 100.00
			<u>-</u>	LING COIL S	ELECTION						^^^_	
										Gross Tota	l Glace	(sf) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F. Deg	ı F Grain	s Dea F	Dea F		Floor 2		, (21) (4)
Main Clg					80,4 68						•	
Aux Clg	0.0	0.0	0.0	0		0.0		0.0		ExFlr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Roof	8,563	0 0
Totals	62.8	754.0								Wall	1,613	460 29
	UEATT	NG COIL SELE	CTION		A 7 f	riowo /-#	\			OHEAKA	T	
	Capaci				Tuna				ENGINEERING			TURES (F)
	(Mbh)				Type Vent	Cooling 8,363	Heating O		g % OA g Cfm/Sqft	30.0		Clg Htg
Main Htg	-441.	,	-	-	Infil	871	871		g Cfm/Jon	1.03 443.66		65.8 75.1
Aux Htg	. 0.		0 0.0		Supply	27,876	27,876		g Sqft/Ton	431.64		75.4 66.5 76.1 67.5
Preheat	-367.				Mincfm	0	27,070		g Stuh/Sqft	27.80		80.4 67.5
Reheat	0		0 0.0		Return	27,876	27,876		. People	65		75.0 68.0
Humidif	0.		0 0.0		Exhaust	8,363	0		g % OA	0.0	Fn MtrTD	1.3 1.3
Opt Vent	0.		0 0.0		Rm Exh	0	0		g Cfm/SqFt	1.03	Fn BldTD	1.0 1.0
Total	-808	. 2			Auxil	0	0		g Btuh/SqFt	-29.80	Fn Frict	2.9 2.9

System 6 8lock DD - DOUBLE DUCT

******	*******	****** C	OOLING COIL	PEAK ****	******	******	***** CLG	SPACE	PEAK ****	****** HEAT	ING COIL P	EAK ******
Peaked a	t Time ==>	,	Mo/Hr:	7/14				/Hr:			Mo/Hr: 13	
Outside (	Air ==>	0A	DB/WB/HR: '	91/ 74/105.	0		* 0	ADB:	91 *		OAD8:	
							*		*			
		Space		Ret. Air		Percnt		pace	Percnt *	Space Pea	k Coil P	eak Percnt
		ns.+Lat.	Sensible			Of Tot			Of Tot *			
Envelope		(Btuh)	(Btuh)	(Btuh)	(Btuh)			tuh)	(%) *	(Btuh	i) (Bt	uh) (%)
Skylite		0	0		0			0	0.00 *		0	0 0.00
Skylite		0	0		0			0	0.00 *		0	0 0.00
Roof Co		14,486	0		14,486			,221	5.79 *	•	6 -48,	
Glass S		17,909	0		17,909			, 285	5.81 *			0.00
Glass (		4,840	0		4,840			,167	1.84 *		0 -24,	
Wall Co		4,161	526		4,687			,622	2.01 *			
Partiti		0			. 0			0	0.00 *		0	0 0.00
•	d Floor	0			0			0	0.00 *		0	0 0.00
Infilt		29,963			29,963			,692			3 -60,	
Sub Tot		71,359	526		71,886			,987		•	5 -152,	560 71.96
Internal		100 117	0				<b>‡</b>		*		_	
Lights		190,447	0		190,447			,839	71.63 *		0	0 0.00
People		30,203	^	^	30,203			,612	5.21 *		0	0 0.00
Misc	tal==>	220 (50	0		000 (50			0	0.00 *		0	0 0.00
Ceiling L		220,650 1,375	-1 775		220,650			,452	76.84 *		0	0 0.00
Outside A		1,373	-1,375 0		0 707 477			,553	0.55 *			0 0.00
Sup. Fan		V	V	U	287,477 158,470			0	0.00 * 0.00 *		0	0.00
Ret. Fan			19,809		136,470				0.00 *			0.00
Duct Heat			17,007		17,007				0.00 *			0.00
OV/UNDR S		5,386	v		5,386			, 386	1.92 *		5 -59,	0.00
Exhaust h		2,000	-9,934	n	-9,934	-1.32		, 300	0.00 *		۰, ۲۵۶ د	
Terminal			0,757	0	7,754				0.00 *			0 0.00 0 0.00
	U) puss		•	•	V	0.00	*		v.vv *			0 0.00
Grand Tot	tal==> -	298,770	9,026	0	753,742	100.00	* 280,	.377	,		8 -211.9	995 100.00
					•						,	
			C00L							**********		
			Sens Cap.			ng DB/WB/H		_	B/WB/HR			s (sf) (%)
" H.J. 01.	(Tons)	(Mbh)	(Mbh)		-	g F Grain	-	_	Grains		7,121	
Main Clg	62.8			27,856					79.4	Part	0	
Aux Clg	0.0	0.0	0.0	0		0.0 0.		0.0	0.0	Exflr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0 0.0	0.0	0.0	0.0		8,563	0 0
Totals	62.8	753.7								Wall	1,613	460 29
	HEATING	COIL SELE	ECTION		AI	RELOWS (cf	m)		NGINEERING	CHECKS	TEMPERAT	TURES (F)
	Capacity				Type	Cooling	Heating		% OA	30.0	Type	Clg Htg
	(Mbh)	(cfn		-	Vent		0		Cfm/Sqft		SADB	65.8 75.1
Main Htg	-230.5	,		75.1	Infil		871	•	Cfm/Ton		Plenum	75.4 66.5
Aux Htg	0.0	,		0.0	Supply	27,856	27,856	_	Sqft/Ton		Return	76.1 67.5
Preheat	-366.6			60.5	Mincfm	0	0	-	Btuh/Sqft		Ret/OA	80.4 67.5
Reheat	0.0		0.0	0.0	Return	27,856	27,856	-	People		Runarnd	75.0 68.0
Humidif	0.0		0.0	0.0	Exhaust	8,357	0		, % OA		Fn MtrTD	1.3 1.3
Opt Vent	0.0		0.0	0.0	Rm Exh	0	0		Cfm/SqFt		Fn BldTD	1.0 1.0
Total	-597.1				Auxil	0	0	_	Btuh/SqFt		Fn Frict	2.9 2.6
								•				•

Trane Air Conditioning Economics 8y: Trane Customer Direct Service Network

BUILDING U-VALUES - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

------ BUILDING U-VALUES-----

											•	_
						m U-Val					Room	Room
0				0		ı/hr/sqf					Mass	Capac.
Room	Danauiatian	01	cc1	Summr	Wintr	D f	Summr	Wintr	W-33	0-21	(1b/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9,61
Zone	<pre>1 Total/Ave.</pre>	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000	<b>.0.000</b>	0.000	0.000	0.000	0.317	45.2	9.27
System	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	<pre>11 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
<i>I</i> one	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
12	STAIRS W ROOF	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
Zone	<pre>12 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	74.1	15.63
13	SUPPLY STORAGE 1	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	<pre>13 Total/Ave.</pre>	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	<pre>8 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
. 10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	<pre>10 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	14 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
15		0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	<pre>15 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	<pre>16 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
Buildin	g	0.229	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	52.6	10.93

Trane Air Conditioning Economics

By: Trane Customer Direct Service Network

BUILDING AREAS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- BUILDING AREAS ------

				Floor	Total		Exposed						
		Numbe	er of	Area/Dupl		Partition	Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room		Dupl	icate	Room	Area	Area	Area	Area	/Rf	Area	Area	/Wl	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	SUB BSMT, BSMT W	1	1	45,125	45,125	13,222	0	0	0	0	0	0	0
Zone	·				45,125	13,222	0	0	0	0	0	0	0
4	BSMT E	1	1	12,424	12,424	3,348	0	0	0	0	. 0	0	0
Zone	4 Total/Ave.				12,424	3,348	0	0	0	0	. 0	0	.0
System	1 Total/Ave.				57,549	16,570	0	0	0	0	0	0	0
	TOILETS, KITCHEN		1	3,520	3,520	0	0	0	0	0	21	11	174
Zone	,				3,520	0	0	0	0	0	21	11	174
	TOILETS W ROOF	i	1	580	580	0	0	0	0	580	0	0	0
Zone	•				590	0	0	0	0	580	0	0	0
System	2 Total/Ave.	,		<b>5</b> ( 0	4,100	0	0	0	0	580	21	11	174
	STAIRS	1	1	560	560	0	0	0	0	0	255	29	625
Zone	•			11 704	560	0	0	0	0	0	255	29	625
	1ST FL OFFICES		1	11,724	11,724	0	0	0	0	0	1,573	19	6,530
Zone	•		,	14 400	11,724	0	0	0	0	0	1,573	19	6,530
	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	0	0	1,610	17	7,730
	7 Total/Ave.	1	,	14 400	14,400	0	0	0	0	0	1,610	17	7,730
	3RD FL OFFICES 9 Total/Ave.		1	14,400	14,400	0	0	0	0	14,400	1,610	17	8,010
Zone	STAIRS W ROOF	1	1	280	14,400 280	0	0	0	0	14,400	1,610	17	8,010
		1	1	280	280	0	0	0	0	280	105	25	307
Zone	3 Total/Ave.				41,364	0	0	0	0	280	105	25	307
System	SUPPLY STORAGE	1	1	2,544	2,544		0	0	0	14,680	5,152	18	23,202
Zone	13 Total/Ave.	1	1	2,344	2,544	1,632 1,632	0	0	0	0	. 0	0	0
System	4 Total/Ave.				2,544	1,632	0	0	0	0	. 0	0	.0
<b>5 9 3 1 6</b>	1ST FL CEN OFFCS	1	1	9,884	9,884	1,032	0	0	0	0	250	19	1,038
Zone	6 Total/Ave.		•	7,004	9,884	0	0	0	0	0	250	19	1,038
8	·	1	1	8,674	8,674	0	0	0	0	0	105	66	55
Zone	8 Total/Ave.	•	•	0,071	8,674	Ô	0	0	0	0	105	66	55
	3RD FL CEN OFFCS	1	1	8,563	8,563	0	Ö	0	0	8,563	105	64	60
	10 Total/Ave.	_	-	0,000	8,563	0	Ö	0	0	8,563	105	64	60
System	5 Total/Ave.				27,121	0	.0	0	0	8,563	460	29	1,153
	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	0,300	250	19	1,038
Zone	14 Total/Ave.		-	.,	9.884	0	0	0	0	0	250	19	1,038
15		1	1	8,674	8,674	0	0	0	0	0	105	66	<b>5</b> 5
Zone	15 Total/Ave.			-,	8,674	0	0	0	0	Ŏ	105	66	<b>5</b> 5
16		i	1	8,563	8,563	0	0	0	Ö	8,563	105	64	60
Zone	16 Total/Ave.			, .	8,563	0	0	0	0	8,563	105	64	60
System	6 Total/Ave.				27,121	0	0	0	0	8,563	460	29	1,153
8uildin					159,799	18,202	0	0	0	32,386	6,095	19	25,681

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ASHRAE 90 ANALYSIS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- A S H R A E 9 O A N A L Y S I S -----

Overall Roof U-Value = 0.088 (8tu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.362 (8tu/Hr/Sq Ft/F)
Overall Building U-Value = 0.224 (8tu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 24.46 (Btu/Hr/Sq Ft) SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

------SYSTEM LOAD PROFILE------

## System Totals

Percent	Cool	ing Loa	ad	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	17.6	0	0	-193,499	18	233	6,545.3	0	. 0	0.0	0	0
5 - 10	35.2	0	4	-386,999	3	40	13,090.7	0	0	0.0	0	0
10 - 15	52.8	7	76	-580,498	- 7	92	19,636.1	0	0	0.0	. 0	. 0
15 - 20	70.4	9	96	-773,997	3	37	26,181.4	0	0	0.0	0	0
20 - 25	88.0	8	84	-967,496	5	59	32,726.8	0	0	0.0	0	0
25 - 30	105.6	5	52	-1,160,996	8	106	39,272.1	0	0	0.0	0	0
30 - 35	123.2	16	173	-1,354,495	8	99	45,817.5	0	0	0.0	0	0
35 - 40	140.7	12	132	-1,547,995	29	364	52,362.8	0	0	0.0	0	0
40 - 45	158.3	9	91	-1,741,494	15	195	58,908.2	0	0	0.0	0	0
45 - 50	175.9	7	72	-1,934,993	3	37	65,453.5	0	0	0.0	0	0
50 - 55	193.5	4	45	-2,128,492	0	0	71,998.9	0	.0	0.0	0	0
55 - 60	211.1	2	22	-2,321,992	0	0	78,544.2	0	0	0.0	0	0
60 - 65	228.7	4	38	-2,515,491	0	0	85,089.6	0	0	0.0	0	0
65 - 70	246.3	7	75	-2,708,990	0	0	91,634.9	0	0	0.0	0	0
70 - 75	263.9	6	65	-2,902,490	0	0	98,180.3	0	0	0.0	0	0
75 - 80	281.5	3	35	-3,095,989	0	0	104,725.6	0	0	0.0	0	0
80 - 85	299.1	1	10	-3,289,488	0	0	111,271.0	0	0	0.0	0	0
85 - 90	316.7	0	0	-3,482,988	0	0	117,816.3	100	2,520	0.0	0	0
90 - 95	334.3	0	0	-3,676,487	0	0	124,361.7	0	. 0	0.0	0	0
95 - 100	351.9	0	0	-3,869,986	0	0	130,907.0	0	0	0.0	0	0
Hours Off	0.0	. 0	7,690	0	0	7,498	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

																		****.
					8 U I	L D I	NG	TEM	PER	A T U I	REP	ROF	ILE	\$				
Temperature										Zone Ni	ımber -							
Range (F)	1	4	2	11	3	5	7	à			6	8	10	14	15	16	. *	
Max. Temp.	82.6	81.5	201.1	120.2	86.6	85.2	84.9	83.5	85.6	96.2	85.2	88.7	84.5	85.2	88.7	84.5		
Mo./Hr.		10 23							7 20		7 2	10 3	7 5	7 2	10 3	7 5		
Day Type	2	2	2	2	4	1	1	4	4	2	5	2	5	5	2	5	•	
			<i></i>						Nu	mber o	f Hour:	s						
Above 100	0	0	8,016					0			0		0	0	0	0		
95 - 100	0	0	0	110	0	0	0	0	0	240	0	0	0	0	0	0		
90 - 95	0	0	91	1,239	0	0	0	0	0	1,494	0	0	0	0	0	0		
85 - 90	0	0				12	0	0	52	1,602	25	552	0	25	552	0		
80 - 85	954	517	227	585	1,193	1,272	1,200	826	1,192	1,215	1,955	3,532	1,608	1,955	3,437	1,608		
75 - 80	5,027	2,814	136	327	1,803	1,962	2,027			818								
70 ~ 75	1,202	3,711	0	1,256	558	579	598	701	501	1,435	1,462	450	1,334	1,306	586	1,323		
65 - 70	1,418	1,516	0	726	1,454	1,481	1,524	1,587	1,425	1,579	1,203	0	1,471	1,265	26	1,397		
60 - 65	159	202	0	178	1,054	1,107	1,104	1,345	1,172	377	504	0	444	553	0	504		
55 - 60	0	0	0	0	957	879	895	875	994	0	299	0	152	312	0	182		,
50 - 55	0	0	0	0	649	624	585	454	664	0	303	0	0	311	0	0		
8elow 50	0	0	0	0	957	844	827	606	799	0	0	0	0	0	0	0		
Min. Temp.	63.8	63.0	68.0	63.6	34.6	35.2	35.2	38.0	36.1	61.7	51.1	68.0	57.8	50.9	68.0	57.6		
Mo./Hr.	1 8	1 10	1 1	2 6	2 11	2 7	2 7	2 7	2 7	1 6	2 7	1 1	1 7	2 7	1 1	1 7	*	
Day Type	5	5	1	5	4	5	5	5	5	5	5	1	5	5	1	5		

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

MONTHLY ENERGY CONSUMPTION -----

	ELEC Off Peak	DEMAND On Peak	STEAM On Peak	WATER	STEAM OMNO On Peak
Month	(kWh)	(kW)	(Therm)	(1000 Gl)	(Thrm/hr)
Jan	163,374	813	11,257	0	67
Feb	147,815	813	10,595	0	67
March	177,304	813	8,100	0	60
April	148,829	813	1,856	0	42
May	191,290	948	0	73	0
June	198,163	1,013	0	. 118	0
July	196,626	1,067	0	193	0
Aug	208,452	1,022	0	130	, <b></b> 0
Sept	174,396	975	0	68	Ç
Oct	162,125	813	1,028	0	41
Nov	152,329	813	4,082	0	53
Dec	155,594	813	9,549	0	65
Total	2,076,296	1,067	46,466	582	67

Building Energy Consumption = 73,424 (Btu/Sq Ft/Year)
Source Energy Consumption = 171,821 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

----- EQUIPMENT ENERGY CONSUMPTION -----

Dof	Equip					W	461 0							
	Code	Jan	Feb	Mar	Apr	mon May		sumption July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS													
	ELEC	78913	71397	86428	75155	82671	82671	75155	86428	75155	82671	75155	75155	946,954
	PK	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7
1	MISC LD													
	ELEC	0	0	0	0	. O	0	0	0	0	0	0	0	. 0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	Ú	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													,
	OIL	0	0	0	0	0	Õ	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	(·	0	0	0	0	0	0	0	0	0 -
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													•
	P HOTH20	0	0	0	0	0	0	0	0	0 -	0	0	0	0
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
. 6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1001S		2~\$1	rg ctv <5	55 TONS									
	ELEC	0	0	0	0	13858	20730	35324	22954	13093	0	0	0	105,959
	PK	0.0	0.0	0.0	0.0	106.5	171.6	225.3	181.1	134.1	0.0	0.0	0.0	225.3
,	EQ5100		0001	.ING TOWE	· R									
	ELEC	0	0	0	0	5115	5115	4650	5348	4650	0	0	0	24,878
	PK	0.0	0.0	0.0	0.0	23.3	23.3	23.3	23.3	23.3	0.0	0.0	0.0	23.3
1	EQ5100		0001	ING TOWE	:R									
	WATER	0	0	0	0	73	118	193	130	68	0	0	0	582
	PΚ	0.0	0.0	0.0	0.0	0.6	0.9	1.2	1.0	0.8	0.0	0.0	0.0	1.2
1	EQ5001		CHIL	LED WATE	R PUMP (	C.V.								
•	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010		CONE	ENSER WA	ITER PUMI	P.C.V.								
-	ELEC	. 0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PΚ	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5300		CONT	ROL PANE	L & INT	ERLOCK								

Trane Air Conditioning Economics

By: Trane Customer Direct Service Network

■ EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3
 ■ WEATHERSTRIP & CAULKING

WEAT	HERSTRIP &	CAULKING												The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s
	ELEC PK	0.0	0.0	0.0	0.0	220 1.0	220 1.0	200 1.0	230 1.0	200 1.0	0.0	0.0	0.0	1,070
2	EQ1000 ELEC PK	0.0	PRE 0 0.0	VENTS CO 0 0.0	OLING ENE O O.O	RGY 0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5001 ELEC PK	0	CHI 0 0.0	LLED WAT O O.O	ER PUMP C 0 0.0	.V. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5010 ELEC PK	0.0	CON 0 0.0	DENSER W 0 0.0	ATER PUMP 0 0.0	C.V. - 0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ4003 ELEC PK	9754 46.4	FC 8825 46.4	CENTRIF. 10683 46.4	FAN C.V. 9290 46.4	10219 46.4	10219 46.4	9290 46.4	10683 46.4	9290 46.4	10219 46.4	9290 46.4	9290 <b>4</b> 6.4	117,051 46.4
1	EQ4003 ELEC PK	2276 10.8	FC 2059 10.8	CENTRIF. 2493 10.8	FAN C.V. 2168 10.8	2384 10.8	2384 10.8	2168 10.8	2493 10.8	2168 10.8	2384 10.8	2168 10.8	2168 10.8	27,312 10.8
2	EQ4003 ELEC PK	0.0	FC 0 0.0	CENTRIF. 0 0.0	FAN C.V. 0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003 ELEC PK	13975 66.5	FC 12644 66.5	CENTRIF. 15305 66.5	FAN C.V. 13309 66.5	14640 66.5	14640 66.5	13309 66.5	15305 66.5	13309 66.5	14640 66.5	13309 66.5	13309 66.5	167,695 66.5
3	EQ4003 ELEC PK	1747 8.3	FC 1580 8.3	CENTRIF. 1913 8.3	FAN C.V. 1664 8.3	1830 8.3	1830 8.3	1664 8.3	1913 8.3	1664 8.3	1830 8.3	1664 8.3	1664 8.3	20,962 8.3
5	EQ4003 ELEC PK	20044 95.4	18135	CENTRIF. 21953 95.4		20998 95.4	20998 <b>9</b> 5.4	19089 <b>9</b> 5.4	21953 95.4	19089 95.4	20998 95.4	19089 95.4	19089 95.4	240,527 95.4
5	EQ4003 Elec PK	2505 11.9	2267	2744	. FAN C.V. 2386 11.9	2625	2625 11.9	2386 11.9	2744 11.9	2386 11.9	2625 11.9	2386 11.9	2386 11.9	30,066 11.9
6	EQ4003 ELEC PK	20030 95.4	18122	21937	. FAN C.V 19076 95.4	20983	20983 95.4	19076 95.4	21937 95.4	19076 95.4	20983 95.4	19076 95.4	19076 95.4	240,355 95.4
6	EQ4003 ELEC PK	2504 11.9	FC 2265 11.9	2742		2623	2623 11.9		2742 11.9	2384 11.9	2623 11.9	2384 11.9	2384 11.9	30,044 11.9
	EQ2101 P STEAM PK	1929 11.5	1816	1388	DISTRICT 318 7.3	0	0.0		0.0	0.0	178 7.1	695 9.2	1637 11.2	7,961 11.5
	505000		ur.	AT MATER	CIDC BU	MID A II								

HEAT WATER CIRC. PUMP C.V.

1 EQ5020

## **EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3 WEATHERSTRIP & CAULKING**

	ELEC	6264	5667	5727	2267	0	0	0	0	0	1402	3937	5966	31,230
-	ЬK	29.8	29.8	29.8	29.8	0.0	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8
1	EQ5061		COND	ENSATE R	LETURN PU	MP		,						
	ELEC	117	106	107	42	0	0	0	0	0	26	74	112	584
	PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
2	EQ2101		PURC	HASED DI	STRICT S	TEAM								
	P STEAM	9328	8779	6712	1538	0	0	0	0	0	850	3386	7913	38,505
	ÞΚ	55.5	55.5	49.8	35.1	0.0	0.0	0.0	0.0	0.0	34.2	44.2	54.2	55.5
2	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	5220	4723	5245	1989	0	0	0	0	0	1715	3778	4971	27,641
	PK	24.9	24.9	24.9	24.9	0.0	0.0	0.0	0.0	0.0	24.9	24.9	24.9	24.9
2	EQ5061		COND	ENSATE R	ETURN PU	MP								
	ELEC	26	23	26	10	0	0	0	0	0	8	19	25	137
	PΚ	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
3	EQ2000		PREV	ENT SUM	OF HEAT	ENERGY								2
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 3 WEATHERSTRIP & CAULKING

-----UTILITY PEAK CHECKSUMS-----

Utility	ELECTRIC	DEMAND
OCTITION	LLLUINIO	DEHMIND

Peak Value 1,066.7 (kW) Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

Grand Total

nout 14 month /				
Eqp. Ref. Equipment Num. Code Name		Utility Demand (kW)	Percnt Of Tot (%)	
Cooling Equipment				
1 EQ1001S	2-STG CTV <555 TONS	309.2	28.98	
Sub Total		309.2	28.98	
Sub Total		0.0	0.00	
Air Moving Equipment				
1 3 5 6	SUMMATION OF FAN ELECTRICAL DEMAND SUMMATION OF FAN ELECTRICAL DEMAND SUMMATION OF FAN ELECTRICAL DEMAND SUMMATION OF FAN ELECTRICAL DEMAND	57.3 74.9 107.4 107.3	7.02 10.07	
Sub Total		346.8	32.51	
Sub Total		0.0	0.00	
Miscellaneous				
Lights Base Utilities Misc Equipment Sub Total			0.00 0.00	
Grand Total		1,066.7	100.00	

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 122

Weather File Code: CARLISLE

Location: ENERGY SAVINGS OPPORTUNITY STUDY

Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)

Winter Design Dry Bulb: 4
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 9:31:32 2/ 2/94

Dataset Name: CB122 .TM

AIRFLOW - ALTERNATIVE 4 LOW E GLASS

------SYSTEM SUMMARY ------(Design Airflow Quantities)

		p. qu to 19 to 10 to 10 to 10	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	TRH	10,853	36,175	36,175	36,175	10,853	0	0
2	SZ	. 0	17,730	17,730	17,730	0	0	17,730
3	INDEP	5,830	19,435	19,435	36,448	19,435	32,234	0
4	UH	0	0	1,835	0	0	0	0
5	DD	8,357	27,856	27,856	28,824	27,856	0	0
6	00	8,357	27,856	27,856	28,824	9,325	0	0
Totals		33,397	129,052	130,887	148,000	67,468	32,234	17,730

CAPACITY - ALTERNATIVE 4 LOW E GLASS

------SYSTEM SUMMARY -------(Design Capacity Quantities)

Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Tons) (8tuh) (8tuh) (Btuh) (8tuh) 1 TRH 81.5 0.0 0.0 81.5 -68,182 0 -480,162 0 -548,345 2 SZ **-9,**837 3.1 0.0 0.0 3.1 0 -106,598 0 0 0 -9,837 0 3 INDFP 46.4 88.5 0.0 134.9 **-680,963 -1,230,942** 0 0 0 -1,911,905 0 4 UH 0.0 0.0 **-6**,715 0 0 0 0.0 0.0 -6,715 5 00 61.9 0:0 0.0 61.9 -448,643 0 -373,989 0 0 -822,632 6 DD 61.9 0.0 -245,454 0 -373,989 0.0 61.9 0 0 -619,443 Totals 254.9 343.4 -1,459,795 -1,230,942 -1,334,738 88.5 0.0 0 0 0 -3,918,877

The building peaked at hour 14 month 7 with a capacity of 254.9 tons

ENGINEERING CHECKS - ALTERNATIVE 4 LOW E GLASS

			Percent		Coo	ling		Heat	ing	
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	8tuh/	Cfm/	8tuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	TRH	30.00	0.63	443.7	705.9	17.00	0.63	-9.53	57,549
2	Main	SZ	0.00	4.32	5,655.8	1,307.9	9.18	4.32	-2.40	4,100
3	Main	INDFP	30.00	0.47	418.7	891.2	13.46	0.47	-16.46	41,364
3	Auxiliary	INDFP	0.00	0.78	364.4	467.7	25,66	0.78	-29.76	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	449.8	437.9	27.40	1.03	-30.33	27,121
6	Main	DD	30.00	1.03	449.8	437.9	27.40	1.03	-22.84	27,121

System 1 Peak TRH - TERMINAL REHEAT

Peaked at Time ==>       Mo/Hr: 7/14       * Mo/Hr: 7/16       * Mo/Hr: 13/         Outside Air ==>       OADB/WB/HR: 91/ 74/105.0       * OADB: 91       * OADB: 4         *       * Space       Ret. Air Ret. Air       Net Percnt * Space Percnt * Space Peak Coil Percont * Sensible Of Tot * Space Sens Tot Sensible Of Tot * Space Sens Tot Sence Peak Sensible Of Tot * Space Sens Tot Sence Peak Skylite Solr       * OADB: 4         *       * Sensible Of Tot * Space Sens Tot Sence Peak Coil Percont * Space Sens Tot Sence Peak Skylite Solr       * OADB: 4         *       * OADB: 4       * OADB: 4         * Space Peak Coil Percont * Space Peak Coil Percont * Space Sens Tot Sence Peak Coil Percont * Space Sens Tot Sence Peak Coil Percont * Space Sens Tot Sence Peak Coil Percont * Space Sens Tot Sence Peak Coil Percont * Space Sens Tot Sence Peak Coil Percont * Space Sens Tot Sence Peak Coil Percont * Space Sens Tot Sence Peak Coil Percont * Space Sens Tot Sence Peak Coil Percont * Space Sens Tot Sence Peak Coil Percont * Space Sens Tot Sence Peak Coil Percont * Space Sens Tot Sence Peak Coil Percont * Space Sens Tot Sence Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak Coil Percont * Space Peak	ak Percnt ns Of Tot h) (%)
* *  Space Ret. Air Ret. Air Net Percnt * Space Percnt * Space Peak Coil Pe Sens. + Lat. Sensible Latent Total Of Tot * Sensible Of Tot * Space Sens Tot Se Envelope Loads (Btuh) (Btuh) (Btuh) (Btuh) (%) * (Btuh) (%) * (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (	ak Percnt ns Of Tot h) (%)
Sens. + Lat. Sensible Latent Total Of Tot * Sensible Of Tot * Space Sens Tot Se Envelope Loads (Btuh) (Btuh) (Btuh) (Btuh) (\$) * (Btuh) (\$) * (Btuh) (Btuh) Skylite Solr 0 0 0.00 * 0 0.00 * 0	ns Of Tot h) (%)
Sens. + Lat. Sensible Latent Total Of Tot * Sensible Of Tot * Space Sens Tot Se Envelope Loads (Btuh) (Btuh) (Btuh) (Btuh) (\$) * (Btuh) (\$) * (Btuh) (Btuh) Skylite Solr 0 0 0.00 * 0 0.00 * 0	ns Of Tot h) (%)
Envelope Loads (Btuh) (Btuh) (Btuh) ( $\%$ ) * (Btuh) ( $\%$ ) * (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) ( $\%$ ) * (Btuh) (Btuh) (Btuh) ( $\%$ ) * (Btuh) (Btuh) ( $\%$ ) * (Btuh) ( $\%$ ) * (Btuh) ( $\%$ ) * (Btuh) ( $\%$ ) * (Btuh) ( $\%$ ) * (Btuh) ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$ ) * ( $\%$	h) (%)
Skylite Solr 0 0 0 0.00 * 0 0.00 * 0	, , ,
	0.00
	0 0.00
Roof Cond 0 0 0 0 0.00 * 0 0.00 *	0 0.00
Glass Solar 0 0 0 0.00 * 0 0.00 * 0	0 0.00
Glass Cond 0 0 0 0 0.00 * 0 0.00 * 0	0.00
Wall Cond 0 0 0 0.00 * 0 0.00 * 0	Q 0.00
Partition 18,940 _ 18,940 1.94 * 18,940 4.00 * -68,182 -68,1	
Exposed Floor 0 0 0.00 * 0 0.00 * 0	0 0.00
Infiltration 0 0.00 * 0 0.00 * 0	0.00
Sub Total==> 18,940 0 18,940 1.94 * 18.940 4.00 * -68,182 -68,1 Internal Loads * *	82 100.00
	0.00
	0.00
	0.00
	0 0.00
Ceiling Load 0 0 0 0 0.00 * 0 0.00 * 0  Outside Air 0 0 0 406.913 41.59 * 0 0.00 * 0	0 0.00
•	0.00
Sup. Fan Heat 77,173 7.89 * 0.00 *	0 0.00
Ret. Fan Heat 18,007 18,007 1.84 * 0.00 *	0 0.00
Duct Heat Pkup 0 0 0.00 * 0.00 *	0 0.00
OV/UNDR Sizing 0 0 -0.00 * 0 -0.00 * 0	0 0.00
Exhaust Heat -5,402 0 -5,402 -0.55 * 0.00 *	0 0.00
Terminal Bypass 0 0 0 0.00 * 0.00 *	0.00
* * * * * * * * * * * * * * * * * * *	
Grand Total==> 481,661 12,605 0 978,353 100.00 * 474,057 100.00 * -68,182 -68,1	82 100.00
自分表示。 第二元元章	
(Max / )	
	(sf) (%)
GAUX Clg 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 EXFIR 0 0.0 Vent 0.0 0.0 0.0 0.0 0.0 Roof 0	Λ Λ
	0 0
Totals 81.5 978.4 Wall 0	0 0
	unco (r)
	URES (F)
	Clg Htg
(Mbh) (cfm) Deg F Deg F Vent 10,853 0 Clg Cfm/Sqft 0.63 SADB Main Htg -68.2 36,175 68.0 69.7 Infil 0 0 Clg Cfm/Ton 443.70 Plenum	63.0 69.7
Main Htg	75.0 68.0
Main Htg       -68.2       36,175       68.0       69.7       Infil       0       0       Clg Cfm/Ton       443.70       Plenum         Aux Htg       0.0       0       0.0       0.0       Supply       36,175       36,175       Clg Sqft/Ton       705.87       Return         Preheat       -480.2       36,175       48.8       61.0       Mincfm       36,175       0       Clg Btuh/Sqft       17.00       Ret/OA	75.5 68.0
	80.0 68.0
Reheat -0.0 0 0.0 0.0 Return 36,175 36,175 No. People 137 Runarnd Humidif 0.0 0 0.0 0.0 Exhaust 10,853 0 Htg % OA 0.0 Fn MtrTD	75.0 68.0
	0.5 0.5
	0.4 0.4
Total -548.3 Auxil 0 0 Htg Btuh/SqFt -9.53 Fn Frict	1.1 1.1

Trane Air Conditioning Economics

By: Trane Customer Direct Service Network

System 2 Peak SZ - SINGLE ZONE

******	******	****** C			*******	******	***	**** CLG	SPACE	PEAK ****	***** HEAT]	NG COIL PEA	K ******
	t Time ==>		•	•	^			-		7/16 *		Mo/Hr: 13/	1
Uutside i	H1r ==>	UH	טט/שט/חג:	91/ 73/ 98.0	J.		*	UA	เกล: เ	91 * *		OADB: 4	
		Space	Ret. Air	Ret. Air	Net	Percnt	*	Sp	ace	Percnt *	Space Peak	Coil Pea	k Percnt
	Se	ns.+Lat.	Sensible	Latent	Total	Of Tot	*	Sensi	ble	Of Tot *	Space Sens	Tot Sen	s Of Tot
Envelope		(Btuh)	(Btuh)	(Btuh)	(Btuh)		*	(8t	uh)	(%) *	(Btuh)	(Btuh	) (%)
Skylite		0	0		0				0	0.00 *		)	0.00
Skylite		0			0	0.00			0	0.00 *			0.00
Roof Co		0	860		860				0	0.00 *		-3,22	
Glass		255	0		255	0.68			255	0.74 *			0.00
Glass (		239	0		239	0.64			239	0.69 *	•		
Wall Co		747	183		929	2.47			747	2.16 *			
Partiti		0			- 0				0	0.00 *			0.00
•	d Floor	0			0	0.00			0	0.00 *			0.00
Infilt Sub To		1 241	1 040		0 207	0.00		1	0	0.00 *			0.00
Internal		1,241	1,042		2,283	6.07	*	1,	241	3.60 * *		-7,23	4 100.00
Lights		30,623	0		30,623	81.40		7.0	623			<b>\</b>	0.00
People		4,712	V		4,712			2,		6.44 *			0 0.00
Misc		7,712	0	0	0			۷,	0	0.00 *			0.00
	tal::>	35,335	0		35,335			32.	845				0.00
			-1,918		0				408	1.18 *			0.00
Outside (		0	0		0	0.00			0	0.00 *			0.00
Sup. Fan	Heat				0	0.00				0.00 *			0.00
Ret. Fan	Heat		0		0	0.00	*			0.00 *			0.00
Duct Hear	t Pkup		0		0	0.00	*			0.00 *			0.00
OV/UNDR S	Sizing	0			0	0.00	*		0	0.00 *	(	)	0 -0.00
Exhaust 1	Heat		0	0	0	0.00				0.00 *			0.00
Terminal	Bypass		0	0	0	0.00	*			0.00 *			0.00
Grand Tol	tal==>	38,494	-876	0	37,618	100.00		34,	495		-3,668	-7,23	4 100.00
			^^	LING COIL SI	CI COTTON							^05^0	
- (1) 1											Gross Total		(sf) (%)
i				(cfm)					_	Grains		,100	()
Main Clg				17,730	-	-		-	_		Part	•	
Aux Clg	0.0	0.0	0.0	. 0	0.0	0.0	0.0	0.0	0.0	0.0	Exflr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	580	0 0
Totals	3.1	37.6									Wall	196	21 11
	HEATING	COIL SEL	ECTION		AI	RFLOWS (	cfm)		{	ENGINEERING	CHECKS	TEMPERATU	RES (F)
	Capacity			Lvg	Type	Cooling	1	Heating	Clg	g % OA	0.0		lg Htg
	(Mbh)	(cf	m) Deg F	Deg f	Vent	0	ı	0	Clg	g Cfm/Sqft	4.32	SADB 7	3.2 68.2
Main Htg	-9.8	•			Infil	0	)	0	Clo	g Cfm/Ton			6.5 67.7
Aux Htg	0.0				Supply					g Sqft/Ton			9.7 67.7
Preheat	-106.6				Mincfm	0	)	0		g Btuh/Sqft			6.6 67.7
Reheat	0.0		0.0					17,730		. People			5.0 68.0
	0.0		0 0.0		Exhaust	0			Ht	g % OA	0.0		0.0 0.0
Opt Vent	0.0		0 0.0	0.0				0		g Cfm/SqFt			0.0 0.0
Total	-9.8				Auxil	0	1	0	Ht	g 8tuh/SqFt	-2.40	Fn Frict	0.0 0.0

System 3 Block INDFP - 4-PIPE INDUCTION

					*******	******	****			PEAK ****	***** HEA	TING COIL F	EAK *	*****
Peaked at			Mo/Hr:	7/14			*		Hr:			Mo/Hr: 13	/ 1	
Outside A	ir ==>	OAD	)B/₩B/HR: '	91/ 74/105.	0		*	0A	NDB:	85 *		OAD8:	4	
							*			*				•
		Space		Ret. Air	Net			Sp	ace	Percnt *	Space Pe	ak Coil P	eak	Percnt
	S	ens.+Lat.	Sensible	Latent	Total	. Of To	t *	Sensi	ble	Of Tot *	Space Sei	ns Tot S	ens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%	() *	(Bt	cuh)	(%) *	(Btul	n) (Bt	uh)	(%)
Skylite	Solr	0	0		0	0.0	* ()		0	0.00 *		0	0	0.00
Skylite	Cond	0	0		0	0.0	00 *		0	0.00 *		0	0	0.00
Roof Ca	nd	474	21,484		21,957	1.2	9 *		664	0.12 *	-1,5	79 -73,	446	3.84
Glass S	olar	77,250	0		77,250		2 *	81,	767	14.31 *	•	0	0	0.00
Glass Co	ond	53,830	0		53,830		5 *		082	7.01 *	-276,28	37 -276,	287	14.45
Wall Co	nd	113,330	16,902		130,232		2 *	168,		29.57 *				19.74
Partiti		. 0	,		. 0		* 0	,	0	0.00 *	•	0	0	0.00
Exposed		0			0		0 *		Ö	0.00 *		0	0	0.00
Infiltra		736,354			736,354		1 *	170.	578	29.85 *		52 -1,184,	-	61.97
Sub Tota		981,237	38,386		1,019,623		9 *	462,		80.85 *		25 -1,911,		100.00
Internal		, , , , , , , , , , , , , , , , , , , ,	00,000		1,017,020	37.0	*	102,	, 000	*	1,772,11	1,711,	, , ,	100.00
Lights	LUGGS	277,628	0		277,628	16.2		70	744	13.95 *		0	0	0.00
People		45,248	V		45,248				070	1.06 *		0	0	0.00
Misc		0	0	0	45,240		10 *		0	0.00 *		0	0	0.00
Sub Tota	al\	322,876	0	0	322,876		10 *		814	15.02 *		0	0	0.00
Ceiling L		14,654	-14,654	V	022,670		10 *		486	4.11 *	-47,8	-		0.00
Outside A		14,634	-14,634	0	252,361		7 *	۷۵,	0 0	0.00 *	-47,0	0	0	
Sup. Fan		V	V	V					U			V	0	0.00
			13,820		110,564		7 *			0.00 *			0	0.00
Ret. Fan 1					13,820		1 *			0.00 *			0	0.00
Duct Heat	•	110	0		.0		*		110	0.00 *		^	0	0.00
OV/UNDR S	-	119	11 0//	^	119		1 *		119	0.02 *		0	0	0.00
Exhaust H			-11,266		-11,266		6 *			0.00 *			0	0.00
Terminal	вураѕѕ		0	0	0	0.0	* ()			0.00 *			0	0.00
One of Tab	-1	1 710 00/	0/ 007	•	. 702 000					*				
Grand lots	al==>	1,318,886	26,287	0	1,708,098	100.0	10 *	5/1,	487	100.00 *	-1,838,93	36 -1,911,	905	100.00
제 되었는 그런 그 경험하게 된			000:	THO ODTI DI	TI COTTON									
jarigas ir s		A				55 /u	0 / 110	·	·	n lun lun				
										8/WB/HR			s (st)	(%)
- N	(Tons)		(Mbh)		Deg F De			-	-		Floor	-		
Main Clg				19,435				59.9			Part	0		
Aux Clg		1,061.4					73.7	65.1	52.9			0		
Opt Vent			0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	14,680		0 0
Totals	134.9	1,618.4									Wall	28,354	5,15	52 18
	HEATIN	G COIL SELE	CTION		AI	RFLOWS	(cfm)			ENGINEERING	CHECKS	TEMPERA	TURES	(F)
¢.		y Coil Ai			Type	Coolin		Heating		g % OA		Type	Clg	
		(cfm			Vent		-	0		g Cfm/Sqft	0.47	SADB	65.1	-
Main Htg	-681.			96.7	Infil					g Cfm/Ton		Plenum	76.1	64.4
Aux Htg				103.1	Supply					g Sqft/Ton	891.20	Return	76.8	64.5
	-0.			59.9		,		0		g Btuh/Sqft		Ret/OA	80.9	64.5
	0.			0.0		19,43		19,435		. People		Runarnd	75.0	68.0
	0.			0.0		5,83		0		g % OA		Fn MtrTD	1.3	1.3
Opt Vent	0.			0.0	Rm Exh	0,00		0		g Cfm/SqFt		Fn BldTD	1.0	1.0
•	-1,911.		J 0.0	0.0	Auxil	32,23				g Btuh/Sqft		Fn Frict	2.9	2.
10141	1,711.	,			HUNII	02,20		01,204	11.6	y otan/ourt	10.40	111 111100	4.7	۲.

System 4 Block UH - UNIT HEATERS

Peak		Time =			Mo/Hr: (	0/0				*	Mo	/Hr: C	)/0 *		Mo/Hr:	13/1	******
	side Ai					0/ 0/ 0.	0			*			*		OADB:	-	
·			C		na Aia	Dat Ain		1	D = u = u A	*	0.		*				
			Spac Sens.+Lat		Ket. Hir Sensible	Ret. Air Latent	r Tot		Percnt Of Tot		১। Sensi	blo	Percnt * Of Tot *	Space Pe Space Se		l Peak	Percnt
Fnve	elope L		sens.rcai Btul)		(8tuh)	(Btuh)	(Bti		(%)			tuh)	(%) *	Space Se (Btu		t Sens (Btuh)	Of Tot (%)
	kylite		(500)	0	(50011)	(OLGII)	(000	0	0.00		(0)	0	0.00 *	(011	0	( o t u ii )	0.00
	kylite			0	0			0	0.00			0	0.00 *		٨	0	0.00
	oof Cor			0	Ů			0	0.00			0	0.00 *		0	0	0.00
	lass Sc			0	0			0	0.00			0	0.00 *		0	0	0.00
	lass Co			0	0			0	0.00			0	0.00 *		n	0	0.00
	all Cor			0	Ô			0	0.00			0	0.00 *		0	0	0.00
	artitic			0	v			0	0.00			0	0.00 *	-6,7	•	-6,715	100.00
	xposed			0			•	0	0.00			0	0.00 *	0,7	0	0,713	0.00
	nfiltra			0				0	0.00			0	0.00 *		0	0	0.00
	ub Tota			0	0			0	0.00			0	0.00 #	-6,7	•	-6,715	100.00
	ernal L			•	·			V	0.00	*		V	v. v	۱, د	1.7	0,713	100.00
	ights	.0003		0	0			0	0.00			0	0.00 *		0	0	0.00
	eople			0	·			0	0.00			0	0.00 *		0	0	0.00
	isc			0	0	0		0	0.00			0	0.00 *		0	0	0.00
	ub Tota	11::>		0	0	0		0	0.00			0	0.00 *		0	0	0.00
	ling Lo			0	0	v		0	0.00			0	0.00 *		0	0	0.00
	side Ai			٥	0	0		0	0.00			0	0.00 *		0	. 0	0.00
	. Fan H			·	•	v		0	0.00			•	0.00 *		V	0	0.00
	. Fan H				0			0	0.00				0.00 *			Ô	0.00
	t Heat				0			0	0.00				0.00 *			0	0.00
	JNDR Si			0	•			0	0.00			0	0.00 *		0	0	0.00
	aust He	-		•	0	0		0	0.00			·	0.00 *		•	Ŏ	0.00
	ninal B				0	0		0	0.00				0.00 *			0	0.00
		7			_	-				*			*			•	•,••
Gran	nd Tota	1==>		0	0	0		0	0.00	t		0	0.00 *	-6,7	15	-6,715	100.00
						ING COIL S	FI FCTTON-						*		ADEA	e	
1 . <del>1</del>	:-					Coil Airfl			DB/WB/				/WB/HR	Gross Tot		lass (si	
V (1)	*	(Tons)				(cfm)	Deg F	_			Deg F			Floor	2,544	1033 (3)	(%)
Main	Cla	0.0	•			0	_		0 0				0.0	Part			
Aux		0.0			0.0	Ŏ	0.0	0.		.0	0.0	0.0	0.0	Exflr	0		
Opt V	-	0.0			0.0	0	0.0	0.		.0	0.0	0.0	0.0	Roof	ő		0 0
Total		0.0			0.0	· ·		••	•	• •		• • • •	•••	Wall	Ö		0 0
													NGINEERING	CHECKS	TEMP	ERATURES	S (F)
			ty Coil		l Ent	Lvg	Type	C	ooling	ļ	leating		; % OA	0.0	Type	Clg	Htg
		(Mbh		cfm)	Deg F	Deg F	Vent		0		0		cfm/Sqft	0.00	SADB		
Main	-			1,835		71.4	Infil		0		0	_	Cfm/Ton	0.00	Plenum		
Aux	_		.0	0		0.0	Supply		0		1,835		Sqft/Ton	0.00	Return		
Prehe			.0	0		0.0	Mincfm		0		0		ßtuh/Sqft		Ret/OA		
Rehea			.0	0		0.0	Return		0		1,835		People	0	Runarn		
Humid			.0	0		0.0	Exhaust		0		0	_	, % OA	0.0	Fn Mtr		
Opt V		0		0	0.0	0.0	Rm Exh		0		0	_	cfm/SqFt		Fn Bld		
Total	1	-6	7				Auxil		0		0		Btuh/SqFt	-2.64	Fn Fri	ct 0.:	1 0.0

System 5 Block DD - DOUBLE DUCT

******	*** <b>**</b> ****	******** ()	ONLING COIL	PEAK ****	******	*********	*****	9040F I	DFAK ****	******* HF	ATTNC COTI	DEVK	
	at Time ==:		Mo/Hr:			,	Ma/			(			*****
Outside	e Air ==>	0AI	08/W8/HR:	91/ 74/105.0	)	2				:	OADB:	4	The second
		2222	Dat Ain	Dat Ain	11-1	0			*			· · · ·	
	S.	Space ens.+Lat.	Sensible	Ret. Air Latent		Percnt ? Of Tot ?					eak Coil		4 4 5 4 4
Envelo	e Loads		(Btuh)		(Btuh)				Of Tot *	•			Of Tot
		(eran)	(66411)		(11111a) 0		•		(%) *		uh) (8		(%)
	te Cond		0		0				0.00 *		0	0	0.00 0.00
Onof	Cond		0		•			0	0.00 * 5.94 *			0	٠,,
		8,014	0		14,486		•	221			286 <b>-48</b>		21.28
	Cond		0		8,014		•		2.64 *			0	0.00
					4,840		•		1.89 *		690 -24		
		4,161	526		4,687				2.06 *	•	677 -18	_	
	tion	0			0			0	0.00 *		0	0	0.00
	sed Floor	-			70.044			0	0.00 *		0		0.00
		32,866			32,866						403 -67		
		64,366	526		64,892	8.73	•	556	18.52 *		056 -159	,300	70.19
	l Loads		_			*			*				
Light		190,447			190,447			839	73.56 *		0	0	0.00
	9	30,203			30,203				5.35 *		0 -	0	0.00
Misc		0	0	0	0				0.00 *		0	0	0.00
	otal==>		v	V	220,650				78.91 *		0	0	0.00
	Load		-1,375		0				0.57 *	-4,0	527	0	0.00
	Air	0	0	0	283,790			0	0.00 *		0	0	0.00
	ın Heat				158,470		(		0.00 *			0	0.00
Ret. Fa			19,809		19,809				0.00 *			0	0.00
	at Pkup		0		0				0.00 *			0	0.00
	Sizing					0.74		476	2.01 *		648 -67	,648	29.81
	Heat		~9,934		-9,934				0.00 *			0	0.00
Termina	l Bypass		0	0	0	-0.00			0.00 *			0	0.00
						1	(		*				
Grand T	otal==>	291,866	9,026	0	743,152	100.00	273,	035	100.00 *	-229,3	331 -226	,948	100.00
				LING COIL SE							ADEAC		
				Coil Airfl									
	(Tone)	(Mhh)	(MAK)	(cfm)	Deg F Deg				Grains			55 (5	1) (%)
Main Clg				27,856							0		
Aux Clg		0.0	0.0	27,030		0.0 0.0		0.0	0.0	ExFlr			
Opt Vent		0.0	0.0	0		0.0		0.0	0.0	Roof	0 5 6 7		۸ ۸
Totals	61.9	743.2	0.0	V	0.0	7.0 0.0	V.V	V.V	0.0	Wall	8,563		0 0
100013	01.7	740.2								nall	1,613	•	460 29
	HFATING	COTI SELE	ction		ΔΤ	PELONS (of	}	F)	ACTNEEDING	CHECKS	TEMPER	ATHOC	c (c)
A Comment	Capacity				Type	Cooling	Heating		% OA	30.0	Type	Clg	
	(Mbh)	•		-	Vent	8,357	0	_		1.03	SADB	_	_
Main Htg	• •		-	-	Infil	968	968		Cfm/Jon		Plenum	66.0	
Aux Htg			0.0		Supply	27,856	27,856		Sqft/Ton		Return	75.4	
_	-374.0					27,030	27,036					76.	
Preheat Reheat								-	Btuh/Sqft		Ret/OA	80.	
# = 1) \( \text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tint{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tin}\xi\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\texi}\text{\text{\text{\texi}\tin}\tint{\text{\texi}\titt{\text{\texi}}\tint{\text{\text{\texi}}\tint{\text{\ti}	0.0		0 0.0		Return Exhaust	27,856 8,357	27,856 0		People % OA	65 0.0	Runarnd	75.0	
				14 (1	EXHAUST	n 177	11	HT/I	x 110	0.0	Fn MtrTD	1	3 1.3
Humidif	0.0												
		)	0 0.0		Rm Exh Auxil	0	0	Htg		1.03	Fn 8ldTD Fn Frict	1.0	0 1.0

System 6 Block DD - DOUBLE DUCT

	t Time ==>		Mo/Hr:				* Mo				Mo/Hr: 13/		
Outside	Alr ==>	UAI	D8/W8/HR:	91/ 74/105.0	)		* 0	AD8:	91 *		OADB: 4	.,	
		Space	Ret. Air	Ret. Air	Net	Percnt	* S	pace	Percnt *	Space Pe	ak Coil Pe	eak Per	ront
	Se	ns.+Lat.			Total	Of Tot		ible					Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	* (8	tuh)	(%) *	(Btu	h) (Bti	ıh)	(%)
		0	0		0	0.00		0	0.00 *		0	0 0	0.00
			0		0	0.00		0			0		0.00
			0						5.94 *		86 <b>-48</b> ,2		1.28
Glass			0		8,014				2.64 *			0 0	0.00
Glass			0		4,840				1.89 *		90 -24,6		0.88
	ond ·		526		4,687			,622	2.06 *		77 -18,9	921 8	8.34
		0			- 0	0.00	*	0	0.00 * 0.00 *		0	0 0	0.00
	d Floor	0			0		*	0	0.00 *		0	0 0	0.00
	ration				32,866						03 -67,4		9.70
		64,366	526		64,892			,556	18.52 *	•	56 -159,3	300 70	0.19
Internal		100 447	0		100 447	25 (7		070	77.57 *		۸		
		30,203			190,447 30,203				73.56 *		0		0.00
Misc		0,200	0	0	30,203				5.35 * 0.00 *		0		0.00
	tal==>		0		220,650				78.91 *		0		0.00
			-1,375		220,030				0.57 *		27		0.00 0.00
	Air				283,790				0.00 *				0.00
Sup. Fan		v	V	v	158,470			V	0.00 *		V		0.00
Ret. Fan			19,809		19,809				0.00 *				0.00
									0.00 *				0.00
OV/UNDR	Sizing	5,476		0	5,476	0.74			2.01 *		48 -67,6		9.81
Exhaust	Heat	,	-9,934	0	-9,934	-1.34		,	0.00 *				0.00
	Bypass		0	0	0	-0.00			0.00 *				0.00
	• '						*		*				
Grand To	tal==>	291,866	9,026	0	743,152	100.00	* 273	,035	100.00 *	-229,3	31 -226,9	48 100	0.00
			coo	LING COIL SE	LECTION						AREAS		
1 × 2 *											al Glass		
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F. De	g F Grai	ns Deg F	Deg F	Grains		27,121	(4.7)	( - )
Main Clg	61.9	743.2	567.3	27,856	80.4 6	8.4 87	.5 60.8	60.4	80.0	Part			
Aux Clg	0.0	0.0	0.0	0	0.0	0.0 0	.0 0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	.0 0.0	0.0	0.0	Roof	8,563	0	(
Totals	61.9	743.2								Wall	1,613	460	29
	UCATTUO	0011 0516	FATTON		A.7.	051000 (-	£ \		CUATUCCATUA				
							•		ENGINEERING		TEMPERAT		
:	Capacity (Mbh)			-	Type	Cooling	Heating		g % DA	30.0			Htg
Main Htg	-245.5	(cfi		-	Vent Infil	8,357 968	0.0		g Cfm/Sqft				75.6
Aux Htg	0.0						968 27.856		g Cfm/Ton				66.5
Preheat	-374.0				Supply Mincfm	27,856 0	27,856		g Sqft/Ton				67.5
	0.0		4.64 مدد 0.0 0		Return		0 27,856		g Btuh/Sqft . People		Ret/OA		67.!
			0.0	v.v	nçtuili	21,030	41,030	110	. reopie	65	Runarnd	75.0 6	68.(
Reheat			0 00	Λ Λ	Evhauet	9 757	٨	11 +	α % ΠΛ	ΛΛ			
	0.0		0 0.0 0 0.0		Exhaust Rm Exh	8,357 0	0		g % OA g Cfm/SqFt		Fn MtrTD Fn 8ldTD	1.3	1.3

Trane Air Conditioning Economics

By: Trane Customer Direct Service Network

BUILDING U-VALUES - ALTERNATIVE 4 LOW E GLASS

------ BUILDING U-VALUES-----

							ues				Room	Room
						/hr/sqf	t/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	<pre>1 Total/Ave.</pre>	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.033	0.000	0.000	0.000	0.317	71.1	15.13
Zone	<pre>11 Total/Ava.</pre>	0.000	0.000	0.000	0.000	880.0	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.083	0.810	0.837	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
- 5	IST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
12	STAIRS W ROOF	0.000	0.000	0.000	0.000	0.038	0.810	0.837	0.229	0.000	146.4	31.13
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	74.1	15.63
13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	13 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
. 8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.310	0.837	0.257	0.000	27.0	5.41
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	<pre>10 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	14 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	15 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	16 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
Buildin	· · · · · · · · · · · · · · · · · · ·	0.229	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	52.6	10.93
	-											

BUILDING AREAS - ALTERNATIVE 4 LOW E GLASS

----- BUILDING AREAS -----

				Floor	Total		Exposed						. •
		Numbs	er of	Area/Dupl		Partition	Floor	Skylight	Skl	Net Roof	Window	₩in	Net Wall
Room		Dupli		Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)		(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	SUB BSMT, BSMT W	1	1	45,125	45,125	13,222	0	0	0	0	0	0	0
Zone			_	,	45,125	13,222	Ŏ	0	0	0	0	0	ŏ
	BSMT E		1	12,424	12,424	3,348	Ö	0	0	0	0	ŏ	ŏ
Zone	4 Total/Ave.		_	,	12,424	3,348	Ö	Ō	0	0	0	0.	ŏ
System	1 Total/Ave.				57,549	16,570	0	0	Ō	0	0	0	ŏ
•	TOILETS, KITCHEN		1	3,520	3,520	0	0	0	0	0	21	11	174
Zone				•	3,520	0	0	0	0	Ō	21	11	174
11	TOILETS W ROOF		1	580	580	0	0	0	0	580	0	0	0
Zone	<pre>11 Total/Ave.</pre>				580	0	0	0	0	580	0	0	ō
System	2 Total/Ave.				4,100	0	0	0	0	580	21	11	174
3	STAIRS	1	1	560	560	0	0	0	0	0	255	29	625
Zone	3 Total/Ave.				560	٥	0	0	0	0	255	29	625
5	1ST FL OFFICES	1	1	11,724	11,724	0	0	0	0	0	1,573	19	6,530
Zone	5 Total/Ave.				11,724	0	0	0	0	0	1,573	19	6,530
7	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	0	0	1,610	17	7,730
Zone	7 Total/Ave.				14,400	0	0	0	0	0	1,610	17	7,730
9	3RD FL OFFICES	1	1	14,400	14,400	0	0	0	0	14,400	1,610	17	8,010
Zone	9 Total/Ave.				14,400	0	0	0	0	14,400	1,610	17	8,010
12	STAIRS W ROOF	1	1	280	280	0	0	0	0	280	105	25	307
Zone	<pre>12 Total/Ave.</pre>				280	0	0	0	0	280	105	25	307
System	3 Total/Ave.				41,364	0	0	0	0	14,680	5,152	18	23,202
13	SUPPLY STORAGE	1	1	2,544	2,544	1,632	0	0	0	0	0	0	. 0
Zone					2,544	1,632	0	0	0	0	0	0	0
F	4 Total/Ave.				2,544	1,632	0	0	0	0	0	0	0
i 7,5. <b>6</b> 1	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	6 Total/Ave.				9,884	0	0	0	0	0	250	19	1,038
. 8	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	<b>5</b> 5
Zone	<pre>8 Total/Ave.</pre>				8,674	0	0	0	0	0	105	66	55
	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	•				8,563	0	0	0	0	8,563	105	64	60
System	5 Total/Ave.				27,121	0	0	0	0	8,563	460	29	1,153
	1ST FL CEN OFFCS	i	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	14 Total/Ave.				9,884	0	0	0	0	0	250	19	1,038
	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	55
Zone	15 Total/Ave.				8,674	0	0	0	0	0	105	66	<b>5</b> 5
	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	<pre>16 Total/Ave.</pre>				8,563	0	0	0	0	8,563	105	64	60
System	6 Total/Ave.				27,121	0	0	0	0	8,563	460	29	1,153
Buildin	g				159,799	18,202	0	0	0	32,386	6,095	19	25,681

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ASHRAE 90 ANALYSIS - ALTERNATIVE 4 LOW E GLASS

----- A S H R A E 90 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 15.92 (Btu/Hr/Sq Ft) Trane Air Conditioning Economics

By: Trane Customer Direct Service Network

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4 LOW E GLASS

## System Totals

Percent	Cool	ling Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Kours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	17.2	0	0	-201,274	18	246	6,544.3	0	0	0.0	0	0
5 - 10	34.3	0	4	-402,547	5	69	13,088.7	0	0	0.0	0	0
10 - 15	51.5	7	76	-603,821	4	57	19,633.1	0	0	0.0	0	.0
15 - 20	68.7	9	100	-805,095	6	86	26,177.4	0	0	0.0	0	0
20 - 25	85.8	14	151	-1,006,369	2	32	32,721.7	0	0	0.0	0	0
25 - 30	103.0	4	45	-1,207,642	8	106	39,266.1	0	0	0.0	0	0
30 - 35	120.2	11	113	-1,408,916	8	107	45,810.5	0	0	0.0	0	0
35 - 40	137.4	19	201	-1,610,190	27	363	52,354.8	0	0	0.0	0	0
40 - 45	154.5	3	30	-1,811,464	15	202	58,899.2	0	0	0.0	0	0
45 - 50	171.7	6	60	-2,012,738	7	94	65,443.5	0	0	0.0	0	0
50 - 55	188.9	6	67	-2,214,012	0	0	71,987.9	0	0	0.0	0	0
55 - 60	206.0	2	23	-2,415,285	0	0	78,532.2	0	0	0.0	0	0
60 - 65	223.2	4	40	-2,616,559	0	0	85,076.6	0	0	0.0	0	0
65 - 70	240.4	8	90	-2,817,833	0	0	91,620.9	0	0	0.0	0	0
70 - 75	257.5	4	45	-3,019,106	0	0	98,165.3	0	0	0.0	0	0
75 - 80	274.7	2	25	-3,220,380	0	0	104,709.6	0	0	0.0	0	0
<b>80 -</b> 85	291.9	0	0	-3,421,654	0	0	111,254.0	0	0	0.0	0	0
85 - 90	309.0	0	0	-3,622,928	0	0	117,798.3	100	2,520	0.0	0	0
<b>90 -</b> 95	326.2	0	0	-3,824,202	0	0	124,342.7	0	0	0.0	0	0
95 - 100	343.4	0	0	-4,025,475	0	0	130,887.0	0	0	0.0	0	0
Hours Off	0.0	0	7,690	0	0	7,398	0.0	0	6,240	0.0	0	8,760

1. 机线

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4 LOW E GLASS

**					7 11 0	101	N G	тсм	0 5 0	ATU	n 1 a	ROF	TIC	e			San San San San San San San San San San	
es de la companya de la companya de la companya de la companya de la companya de la companya de la companya de					9 V I		n u	1 <b>C</b> N	rin	H I V I	K C P	K U F	111	J		-		
Temperature	~~~~									Zone Ni	umber ·					". 		
Range (F)	1	4	2	11	3	5	7	9				8	10	14	15	16		
Max. Temp.	82.6	81.5	198.7	120.2	84.1	84.0	83.8	81.8	83.1	96.2	84.3	88 1	84.2	84.3	88.1	84 2		
Mo./Hr.		10 23					7 23	7 24	7 24	8 17	7 3	10 2	7 6	7 3		7 6		
Day Type	2					1	1	1	1	2	5	2	5	5		5		×
									Mor	mber o	F Ugur							
Above 100	0	۰۰۰۰۰۰	Φ Δ14	4,086	0	0	۰۰۰۰۰	0	_			c	0	۰۰۰۰۰۰	۰۰۰۰۰	۸	· • • • • • • • • • • • • • • • • • • •	
95 - 100	0					•	- 0	•	•	•	0	0	0	v 1	۸	۸ .		
90 - 95	0	0	•	1,239		-	-	0	-	1,494	-	0	0	-	۸	۸		
8590	0	0		•		-	0	0		1,602	0	453	0	0	453	۸	**	
80 - 85	954	•				•	868	-		1,215	٠		•	Ų		1 570		
75 - 80		2,814								818						•		
70 - 75		3,711		1,256			672			1,435				1,174				
65 - 70		1,516		•						1,579				1,376		1,308		
60 - 65	159							1,252						•		1,451 510	10.5	
55 - 60	137				1,027				1,150			0					15 A 17 The	
50 - 55	0		-			-			•			0						
Below 50	0	-	-		1,230							0	-			۸		,
. nerow no	V	V		V	1,230	712	073	151	730	V	J	V	V	O	V	V		
Min. Temp.	63.8	63.0	68.0	63.6	32,4	33.6	33.7	36.3	34.1	61.7	50.0	67.9	57.4	49.8	67.9	57.2		
Mo./Hr.	1 8	1 10	1 1	2 6	2 11	2 7	2 7	2 7	2 7	1 6	2 7	1 7	1 7	2 7	1 7	1 7		
Day Type	5	5	1	5	4	5	5	5	5	5	5	i	5	5	1	5	•	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4 LOW E GLASS

------ MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (k₩h)	DEMAND On Peak (kW)	STEAM On Peak (Therm)	WATER (1000 Gl)	STEAM DMND On Peak (Thrm/hr)
Jan	163,358	813	12,331	0	72
Feb	147,800	813	11,547	0	72
March	178,338	813	9,310	0	66
April	150,842	813	2,990	0	48
May	190,942	946	0	70	0
June	196,626	1,002	0	_ 108	. 0
July	194,441	1,057	0	182	0
Aug	206,928	1,017	0	120	0
Sept	173,936	964	0	65	0
Oct	165,117	813	1,997	0	47
Nov	152,835	813	5,066	0	60
Dec	155,579	813	10,554	0	71
Total	2,076,741	1,057	53,795	544	72

Building Energy Consumption = **78,019 (Btu/Sq** Ft/Year) Source Energy Consumption = 177,964 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 LOW E GLASS

----- EQUIPMENT ENERGY CONSUMPTION------

Dof	Equip					Mon	thlu Can	cumntion						
Num		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS													
	ELEC PK	78913 410.7	71397 410.7	86428 410.7	7 <b>5</b> 155 410.7	82671	82671	75155	86428	75155	82671	75155	75155	946,954
	rn	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7
1	MISC LD													
	ELEC PK	0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
	T IN	0.0	0.0	0.0	v.v	0.0	٧.٧	0.0	0.0	0.0	0.0	۷.0	0.0	0.0
2	MISC LD	^	^	۸	٥	^	•	•		•				
	GAS PK	0.0	0 0.0	0 0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0
	•						***	• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	***	0.0	0.0	0.0	7
3	MISC LD OIL	0	0	0	0	0	0	0	0	0.	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
á	MISC LD													
. 4	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
-	P HOTH20	0	0	0	0	Ĉ	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL PK	0.0	0 0.0	0 0.0	0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0.0	0	0	0
	TA.	0.0	<b>v.</b> v	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1001S ELEC	۸		TG CTV <5		1750/	4.004.2	77151	01.115	10/50			_	
ar M	PK	0.0	0 0.0	0.0	0.0	13526 104.7	19210 160.8	33154 215.4	21448 175.6	12650 122.5	0.0	0 0.0	0 0.0	99,988 215.4
												***	***	22371
1	EQ5100 ELEC	0	C001	LING TOWE 0	ir O	5115	5115	4650	5348	4650	0	0	0	24,878
, .	PK.	0.0	0.0	0.0		23.3	23.3	23.3	- 23.3	23.3	0.0	0.0	0.0	23.3
	F05100		COOL	דער דרשר	· n									
1	EQ5100 Water	0	0	ING TOWE O	.х О	70	108	182	120	65	0	0	0	544
	PK	0.0	0.0	0.0	0.0	0.6	0.9	1.1	1.0	0.7	0.0	0.0	0.0	1.1
1	EQ5001		CHI	LED WATE	R PUMP I	n V								
•	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010		CONE	DENSER WA	TER PUM	P C.V.								
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5300		CONT	TROL PANE	L & INT	ERLOCK							•	

Trane Air Conditioning Economics

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EQUIPMENT	ENERGY	CONSUMPTION	-	ALTERNATIVE 4
LOW E GLAS	SS			

1 EQ5020

HEAT WATER CIRC. PUMP C.V.

LUII	E GENOU													
	ELEC PK	0.0	0.0	0.0	0.0	220 1.0	220 1.0	200 1.0	230 1.0	200 1.0	0.0	0.0	0.0	1,070 1.0
2	EQ1000		PRE	EVENTS CO	OLING EN	FRGY								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5001		CHI		ER PUMP (	C.V.								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5010	^		,	IATER PUMP		_							
	ELEC PK	0 0.0	0	0	0	- 0	0	0	0	0	0	0	0	0
	<b>γ</b> Λ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ4003				FAN C.V.									
	ELEC	9754	8825	10683	9290	10219	10219	9290	10683	9290	10219	9290	9290	117,051
	PK	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4
1	EQ4003		FC	CENTRIF.	FAN C.V.									/
	ELEC	2276	2059	2493	2168	2384	2384	2168	2493	2168	2384	2168	2168	27,312
	PK	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
2	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	0	0	0	9	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003				FAN C.V.									
	ELEC	13975	12644	15305	13309	14640	14640	13309	15305	13309	14640	13309	13309	167,695
	PK	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5
3	,EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	1747	1580	1913	1664	1830	1830	1664	1913	1664	1830	1664	1664	20,962
	PK	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
5	EQ4003				FAN C.V.									
	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	19076	240,355
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
5	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	30,044
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
6	EQ4003				FAN C.V.									
	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	19076	240,355
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
6	EQ4003				FAN C.V.									
	ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	30,044
	ÞΚ	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
1	EQ2101				ISTRICT S									
	P STEAM	2113	1979	1589	512	0	0	0	0	0	335	859	1809	9,197
	PΚ	12.4	12.4	11.3	8.2	0.0	0.0	0.0	0.0	0.0	8.0	10.4	12.2	12.4

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 LOW E GLASS

	PK PK	6264 29.8	5667 29.8	6294 29.8	2983 29.8	0.0	0.0	0.0	0.0	0.0	2565 29.8	4057 29.8	5966 29.8	33,795 29.8
1	EQ5061		COND	ENSATE E	ETURN PU	MP								
	ELEC	117	106	118	56	0	0	0	0	0	48	76	112	632
	PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
2	EQ2101		PURC	:HASED DI	STRICT S	TEAM								
	P STEAM	10217	9568	7721	2478	0	0	0	0	0	1662	4207	8745	44,598
	PK	59.7	59.7	54.5	39.4	0.0	0.0	0.0	0.0	0.0	38.5	50.1	58.8	59.7
2	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	5220	4723	5717	3281	0	0	0	0	0	<b>35</b> 30	4176	4971	31,618
	PX	24.9	24.9	24.9	24.9	0.0	0.0	0.0	0.0	0.0	24.9	24.9	24.9	24.9
2	EQ5061		COND	ENSATE R	ETURN PU	MP								
	ELEC	26	23	28	16	0	0	0	0	0	17	21	25	157
	PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
3	EQ2000		PREV	ENT SUM	OF HEAT	ENERGY								,
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 4 LOW E GLASS

 U	Ţ	I	L	I	Ţ	Y	Р	E	A	K	С	Н	٤	С	K	S	U	М	S	****************
				-				_			-		_	•		_	-	٠.	-	

Utility	ELECTRIC	DEMAND
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Peak Value 1,056.7 (kW)
Yearly Time of Peak 14 (hr) 7 (mo)

## Hour 14 Month 7

Grand Total

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)		
Cooli	ng Equipment				
1	E910018	2-STG CTV <555 TONS	299.3	28.32	
Sub T	otal		299.3	28.32	
Sub T	otal		0.0	0.00	
Air M	oving Equipment				
1 3 5 6		SUMMATION OF FAN ELECTRICAL DEMAND SUMMATION OF FAN ELECTRICAL DEMAND SUMMATION OF FAN ELECTRICAL DEMAND SUMMATION OF FAN ELECTRICAL DEMAND	57.3 74.9 107.3 107.3	10.15	
Sub T	otal		346.8	32.81	
Sub T	otal		0.0	0.00	
Misce	llaneous				
4	Utilities Equipment		0.0	38.86 0.00 0.00 38.86	

1,056.7 100.00

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 122

Weather File Code: CARLISLE Location: ENERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) Summer Design Wet Bulb: 72 (F) Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 Air Density: 0.0742 (Lbm/cuft) Air Specific Heat: 0.2444 (8tu/lbm/F) Density-Specific Heat Prod: 1.0882 (8tu-min./hr/cuft/F) Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft) Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 11:42:49 2/2/94
Dataset Name: CB122B .TM

AIRFLOW - ALTERNATIVE 1
REPLACE FLUORESCENT LAMPS

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	TRH	10,853	36,175	36,175	36,175	10,853	0	0
2	SZ	0	17,730	17,730	17,730	0	0	17,730
3	INDFP	5,830	19,435	19,435	36,448	19,435	35,813	. 0
4	UH	0	0	1,835	0	0	0	0
5	DD	8,357	27,856	27,856	- 28,824	27,856	0	0
6	DD	8,357	-27,856	27,856	28,824	9,325	0	0
Totals		33,397	129,052	130,887	148,000	67,468	35,813	17,730

CAPACITY - ALTERNATIVE 1
REPLACE FLUORESCENT LAMPS

(Design Capacity Quantities)

------ Cooling ------- Heating ------Main Sys. Aux. Sys. Opt. Vent Cooling Main Sys. Aux. Sys. Preheat Reheat Humidif. Opt. Vent Heating System System Capacity Capacity Capacity Totals Capacity Capacity Capacity Capacity Capacity Capacity Totals Number Type (Tons) (Tons) (Tons) (Tons) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) (Btuh) 1 TRH 76.6 0.0 0.0 76.6 -68,182 -523,059 -591,242 2 SZ 0 2.9 0.0 2.9 0.0 -9,837 -109,353 0 0 0 -9,837 3 INDFP 46.4 101.4 0.0 147.8 -680,963 -1,230,942 0 0 0 0 -1,911,905 0.0 4 UH 0.0 0.0 0.0 -6,715 0 0 0 -6,715 5 DD 60.7 0.0 0.0 60.7 -437,529 0 -385,103 0 0 -822,632 6 DD 60.7 0.0 0.0 60.7 -245,454 0 -385,103 0 0 -630,557 348.7 -1,448,680 -1,230,942 -1,402,619 247.3 101.4 0.0 0 -3,972,888

The building peaked at hour 14 month 7 with a capacity of 247.3 tons

ENGINEERING CHECKS - ALTERNATIVE 1 REPLACE FLUORESCENT LAMPS

-----ENGINEERING CHECKS-----ENGINEERING

			Percent		Coo	ling		Heat	ing	
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	8tuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	TRH	30.00	0.63	472.2	751.1	15.98	0.63	-10.27	57,549
2	Main	SZ	0.00	4.32	6,103.3	1,411.4	8.50	4.32	-2.40	4,100
.3	Main	INDFP	30.00	0.47	418.7	891.2	13.46	0.47	-16.46	41,364
3	Auxiliary	INDEP	0.00	0.87	353.3	408.1	29.40	0.87	-29.76	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	458.9	446.8	26.86	1.03	-30.33	27,121
6	Main	DD	30.00	1.03	-458.9	446.8	26.86	1.03	-23.25	27,121

System 1 Peak TRH - TERMINAL REHEAT

Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1 OAD8/W8/HR: 91/ 74/105.0 OAD8: 4 Outside Air ==> OAD8: 91 Space Ret. Air Ret. Air Net Percnt \* Space Percnt \* Space Peak Coil Peak Percnt Sens. +Lat. Sensible Latent Total Of Tot \* Sensible Of Tot \* Space Sens Tot Sens Of Tot (Btuh) (%) \* (Stuh) 0 0.00 \* 0 (%) \* (Btuh) (Btuh) (%) 0.00 \* 0 0.00 Envelope Loads (Btuh) (Btuh) (Btuh) ó Ó Ó Wall Cond 0 0

Partition 18,940

Exposed Floor 0

Infiltration 0

Sub Total==>
cernal Load=
igh\* Skylite Solr 0 0.00 0 0 0.00 \* 0 0.00 \* 0 0.00 0 0.00 0 0.00 \* 0 0.00 \* 0 0 0.00 \*
0 0.00 \*
0 0.00 \*
- 18,940 2.06 \* 18
0 0.00 \*
0 0.00 \* 0 0.00 \* 0 0 0.00 0.00 \* 0 0 0.00 0.00 \* 0 0 0.00 0.00 \* 0 0 0.00 4.39 \* -68,182 -68,182 100.00 0.00 \* 0 0 0.00 0.00 \* 0 0 0.00 0 0 18,940 0 0 4.39 \* -68,182 -68,182 100.00 18,940 Internal Loads Lights 358,437 0 358,437 38.99 \* 381,123 88.39 \*
People 63.941 6.95 \* 31,097 7.21 \*
Misc 0 0 0 0 0.00 \* 0 0.00 \*
Sub Total==> 422,378 0 0 422,378 45.94 \* 412,220 95.61 \* 0 0 0 0.00 People Misc 0.00 0 0.00 0 0 0 0.00 Sub Total==> 422,378 0 0 0.00 0 0.00 0 0.00 0 0 0.00 \* Ceiling Load 0 0 Outside Air 0 388,314 42.24 \* 0 0 0.00 \* 77,173 8.39 \* 18,007 1.96 \* 18,007 0 Sup. Fan Heat 0.00 \* Ret. Fan Heat 0.00 \* 0 0.00 0 0 -0.00 \* -5,402 0 -5,402 -0.53 \* 0 0 0 0.00 \* \* 0.00 \* Duct Heat Pkup 0 0.00 OV/UNDR Sizing 0 -0.00 \* 0 0 0.00 Exhaust Heat 0.00 \* 0 0.00 Terminal Bypass 0.00 \* 0 0.00 Grand Total==> 441,318 12,605 0 919,411 100.00 \* 431,160 100.00 \* -68,182 -68,182 100.00 Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 57,549 919.4 679.2 36,175 80.0 67.9 85.7 62.1 60.2 77.2 Part 16,570 Main Clo 76.6 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Aux Clg 0.0 0.0 ExFlr 0 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 Opt Vent 0.0 Roof 0.0 0 0 0 919.4 Totals 76.6 Wall 0 
 Type
 Cooling
 Heating
 Clg % OA
 30.0
 Type
 Clg
 Htg

 Vent
 10.353
 0
 Clg Cfm/Sqft
 0.63
 SADB
 64.0
 69.7
 Capacity Coil Airfl Ent Lvg (Mbh) (cfm) Deg F Deg F Vent 64.0 69.7 36,175 68.0 69.7 Infil O O Clg Cfm/Ton Main Htg -68.2 472.15 Plenum 75.0 68.0 0.0 0.0 0.0 
 Supply
 36,175
 36,175
 Clg Sqft/Ton
 751.12
 Return

 Mincfm
 36,175
 0
 Clg Btuh/Sqft
 15.98
 Ret/OA
 75.5 68.0 Aux Htg -523.1 36,175 48.8 62.1 Preheat 80.0 68.0 0 0.0 0.0 Return 36,175 36,175 No. People Reheat -0.0 137 Runarnd 75.0 68.0 Exhaust 10,853 0 Htg % OA 0.0 Fn MtrTD 0.5 0.5 Rm Exh 0 0 Htg Cfm/SqFt 0.63 Fn BldTD 0.4 0.4 Auxil 0 Htg Btuh/SqFt -10.27 Fn Frict 1.1 1.1 0.0 0 0.0 0.0 Humidif 0.0 0 0.0 0.0 Opt Vent Total -591.2

System 2 Peak SI - SINGLE ZONE

******	*******	****** C	OOLING COIL	PEAK ****	******	*****	****	**** CLG	SPACE	PEAK ****	***** HEAT	TING COIL	PEAK	****	***
	t Time ==>		Mo/Hr: 7				*		/Hr:			Mo/Hr:			٠,
Outside	Air ==>	0A	DB/WB/HR: 9	1/ 73/ 98.	0		*					OADB:			4
							*			*				Militar	
		Space	Ret. Air	Ret. Air	Ne	t Perc	it *	S:	pace	Percnt *	Space Pea	ak Coil	Peak	Per	cnt
	Ser	ns.+Lat.	Sensible	Latent	Tota			•	ible		•		Sens	Of	
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(8tuh		() *	(81		(%) *			3tuh)	1 10	
Skylit	e Salr	0	0	, ,	•		10 *	,	0	0.00 *	-	_	Ó		.00
Skylit	e Cond	0	0				00 *		0	0.00 *		0	0	0	
Roof C	ond	0	860		86		7 *		0	0.00 *		0 -3	3,224		.57
Glass	Solar	595	0		59		11 *		595	1.87 *		0	´ 0		.00
Glass	Cond	239	0		23		9 *		239			39 -	1,139		
Wall C	ond	747	183		92		7 *		747	2.35 *			2,870		.68
Partit	ion	0			F .	0 0.0	0 *		0	0.00 *		0	, 0		.00
Expose	d Floor	0					00 *		0	0.00 *		0	0	0	
Infilt	ration	0				0 0.0	10 *		0	0.00 *			0		.00
Sub To	tal::>	1,581	1,042		2,62	3 7.5	2 *	1.	,581	4.98 *	-3,42	26 -	7,234	100	
Internal	Loads				,		*	•	,	*			,	7.7	
Lights		27,525	0		27,52	5 78.9	16 *	27,	,525	86.72 *		0	0	0	.00
People		4,712			4,71	2 13.5	2 *	2,	,223	7.00 *		0	0		.00
Misc		0	0	0		0.0	00 *		0	0.00 *		0	0		.00
Sub To	tal==>	32,237	0	0	32,23	7 92.4	8 *	29,	747	93.72 *		0	0		.00
Ceiling	Load	1,918	-1,918			0.0	* 00		411	1.30 *	-24	13	0	. 0	.00
Outside	Air	0	0	0		0.0	0 *		0	0.00 *		0	0	0	.00
Sup. Fan	Heat					0.0	00 *			0.00 *			0	0	00.0
Ret. Fan	Heat		0		1	0.0	10 *			0.00 *			0	0	00.0
Duct Hea			0			0.0	* 0			0.00 *			0	0	00.0
OV/UNDR	-	0				0.0	10 *		0	0.00 *		0	0	-0	.00
Exhaust			0	0			0 *			0.00 *			0	0	00.0
Terminal	Bypass		0	0	1	0.0	* 0			0.00 *			0	0	00.0
Grand To	tal==>	35.736	-876	0	34 86	0 100 0	* * 01	31	739	100 00 *	-3,66	(g	7,234	100	ا مم
		,	0,0	·	01,00	. 10010	•	Ψ2,	, ,	100.00	0,00	,	, 204	100	
			C00L												
			Sens Cap.							B/WB/HR			ass (s	f) (	(%)
N-1-01-	(Tons)				-	_						4,100			
Main Clg	2.9	34.9		17,730			97.1			99.4	Part	0			
Opt Vent			0.0									0			
Totals	0.0 2.9	0.0 34.9	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	580		0	0
101412	2.9	34.7									Wall	196		21	11
	HEATING	COIL SELE	ECTION		A	IRFLOWS	(cfm)			ENGINEERING	CHECKS	TEMPE	RATURE	S (F)	
	Capacity	Coil A:	irfl Ent	Lvg	Type	Coolir	ıg	Heating	Cl	g % OA	0.0	Type	Clg		itg
•	(Mbh)	(cfr	m) Deg F	Deg F	Vent		0	0	Cle	g Cfm/Sqft	4.32	SADB	73.		8.2
Main Htg	-9.8	17,	730 67.7	68.2	Infil		0	0	Cle	g Cfm/Ton	6103.28	Plenum	76.		7.7
-Aux Htg	0.0		0.0	0.0	Supply	17,73	0	17,730	Cle	g Sqft/Ton	1411.36	Return	79.		7.7
Preheat	-109.4	17,	730 67.7	73.4	Mincfm		0	0		g Btuh/Sqft	8.50	Ret/OA	76.		7.7
Reheat	0.0		0.0	0.0	Return		0	17,730	No.	. People	10	Runarnd	75.		8.0
Humidif	0.0		0.0	0.0	Exhaust		0	0	Ht	g % DA	0.0	Fn MtrT			0.0
Opt Vent	0.0		0.0	0.0	Rm Èxh	17,73	0	0	Ht	g Cfm/SqFt	4.32	Fn BldT0	0.		0.0
Total	-9.8				Auxil		0	0	Ht	g Btuh/SqFt	-2.40	Fn Fric	t 0.	0	0.0

System 3 Block INDFP - 4-PIPE INDUCTION

******	******	****** CI			*******	******	***** CLG	SPACE	PEAK ****	***** HEA	TING COIL P	EAK *	*****
	t Time ==		Mo/Hr:				* Mo,	/Hr: 3	7/19 *		Mo/Hr: 13	/ i	
Outside	Air ==>	OAI	D8/W8/HR: '	91/ 74/105.	0		* 04	108: 8	35 *		OADB:	4	
		0=0==	Dat Air	D=4 A:	U - 1		*		*				
	0.	Space		Ret. Air		Percnt	,	pace	Percnt *	•			Percnt
<b>5</b>		ens.+Lat.	Sensible			Of Tot			Of Tot *	,			Of Tot
Envelope		(8tuh)	(Btuh)	(8tuh)	(Btuh)		,		(%) *	-	•	-	(%)
Skylit		0	0		0			0	0.00 *		0	0	0.00
Skylit		0	0		0	* * * * * * * * * * * * * * * * * * * *		0	0.00 *		0	0	0.00
Roof C			21,484		21,957			664	0.10 *		79 -73,	446	3.84
Glass		171,927	0		171,927				27.84 *		0	0	0.00
Glass		53,830	0		53,830				6.01 *				14.45
	ond		16,902		130,232			,977	25.32 *		07 -377,	319	
Partit		0			- 0			0	0.00 *		0	0	0.00
	d Floor	0			0			0	0.00 *		0	- 0	0.00
Infilt		736,354			736,354			578	25.56 *		52 -1,184,		61.97
		1,075,915	38,386		1,114,301	62.79	<b>*</b> 566.	123	84.82 *	-1,791,1	25 -1,911,	905	100.00
Internal							*		*			*	
Lights		249,542	0		249,542	14.06	* 71,	677	10.74 *		0	0	<i>6</i> 0.00
People		45,248			45,248	2.55	* 6,	070	0.91 *		0	0	0.00
Misc		0	0	0	0	0.00	*	0	0.00 *		0	0	0.00
Sub To	tal::>	294,790	0	0	294,790	16.61	* 77,	746	11.65 *		0	0	0.00
Ceiling	Load	14,654	-14,654		0	0.00	* 23,	486	3.52 *	-47,8	11	0	0.00
Outside :		0	0	0	252,361	14.22	*	0	0.00 *		0	0	0.00
Sup. Fan	Heat				110,564	6.23	*		0.00 *			0	0.00
Ret. Fan	Heat		13,820		13,820	0.78	*		0.00 *			0	0.00
Duct Hea	t Pkup		0		0	0.00	*		0.00 *			0	0.00
OV/UNDR :	Sizing	119			119	0.01	*	119	0.02 *		0	0	0.00
Exhaust	Heat		-11,266	0	-11,266	-0.63	*		0.00 *			0	0.00
Terminal	Bypass		0	0	0	0.00	*		0.00 *			0	0.00
							*		*				
Grand To	tal:=> 1	1,385,477	26,287	0	1,774,689	100.00	* 667,	475	100.00 *	-1,838,9	36 -1,911,	905	100.00
d April					, ,					, ,	-,,		
<u> </u>		· · · · · · · · · · · · · · · · · · ·	coo!	ING COIL S	ELECTION						AREAS		
i sa jakolalai 17 Taran	Total (	Capacity	Sens Cap.	Coil Airfl	Enteri	ng DB/WB/	iR Leav	ing DE	3/W8/HR	Gross Tot	al Glas	s (sf)	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F. De	g F Grain	ns Deg F	Deg F	Grains	Floor	41,364	•	`
Main Clg	46.4	557.0	402.9	19,435	80.9 6	6.7 78	.0 59.9	57.7	69.7	Part	0		
Aux Clg	101.4	1,216.2	743.2	35,813	75.0 6	4.5 76	.4 65.1	53.2	43.1	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0 0.	.0 0.0	0.0	0.0	Roof	14,680		0 0
Totals	147.8	1,773.2									28,354	5,15	
											·	,	
	HEATING	COIL SELE	ECTION		AI	RFLOWS (c	fm)	8	ENGINEERING	CHECKS	TEMPERA	TURES	(F)
	Capacity	/ Coil A	irfl Ent	Lvg	Type	Cooling	Heating	Clg	3 % OA	30.0	Type	Clg	` Ĥtg
7 *	(Mbh)	(cf	n) Deg F	Deg F	Vent	5,830	0	Clg	Cfm/Sqft	0.47	SADB	65.1	96.7
Main Htg	-681.0	19,4		96.7	Infil		17,013		cfm/Ton	418.73	Plenum	76.1	64.4
Aux Htg	-1,230.9			99.6		19,435	19,435		Sqft/Ton	891.20	Return	76.8	64.5
Preheat	-0.0			59.9	Mincfm	0	0		Btuh/Saft		Ret/OA	80.9	64.5
Reheat	0.0		0.0	0.0		19,435	19,435		People	98	Runarnd	75.0	68.0
Humidif	0.0		0.0	0.0		5,830	0			0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0			0.0	Rm Exh	0	0		cfm/SqFt	0.47	Fn 8ldTD	1.0	1.0
Total	-1,911.9				Auxil	35,813	35,813		Btuh/SaFt		Fn Frict	2.9	2.9
	,					,	,	•	- , , , ,				

System 4 Block UH - UNIT HEATERS

********	:*****	****** C	OOLING COIL	PEAK ****	******	*****	******	**** CLG	SPACE	PEAK ****	***** HE	ATING CO	IL PEAK *	******
Peaked at T	ime ==>	•	Mo/Hr:	0/0			*	Mo	/Hr: (	0/0 *		Mo/Hr	: 13/ 1	
Outside Air	::>	OA	DB/WB/HR:	0/ 0/ 0	.0		*	0	ADB:	0 *		OADB	: 4	
		Space	Ret. Air	Ret. Air	N	let Pe	ront *	S	pace	Percnt *		eak Co	il Peak	Percnt
. ,	Se	ns.+Lat.	Sensible	Latent	Tot	al Of	Tot *	Sens	ible	Of Tot *	Space S	ens To	ot Sens	Of Tot
Envelope Lo	ads	(Btuh)	(8tuh)	(Btuh)	(Btu	h)	(%) *	(8	tuh)	(%) *	(8t	uh)	(Btuh)	(%)
<b>S</b> kylite S	olr	0	0			0 (	0.00 *		0	0.00 *		0	0	0.00
Skylite C		0	0			0 (	0.00 *		0	0.00 *		0	0	0.00
Roof Cond		0	0			0 (	0.00 *		0	0.00 *		0	0	0.00
Glass Sol		0	0			0	0.00 *		0	0.00 *		0	0	0.00
Glass Con		0	. 0			0 (	).00 *		0	0.00 *		0	0	0.00
Wall Cond		0	0			0 (	0.00 *		0	0.00 *		0	0	0.00
Partition		0				0 (	).00 *		0	0.00 *	-6,	715	-6,715	100.00
Exposed F		0			•	0 (	0.00 *		0	0.00 *		0	0	0.00
Infiltrat		0				0 (	* 00.0		0	0.00 *		0	0	0.00
Sub Total		0	0			0 (	).00 *		0	0.00 *	-6,	715	-6,715	100.00
Internal Lo	ads						*			*				
Lights		0	0				).00 *		0	0.00 *		0	0	0.00
People		0				0 (	).00 *		0	0.00 *		0	0	0.00
Misc		0	0	0		0 (	).00 *		0	0.00 *		0	.0	0.00
Sub Total		0	0	0			* 00.0		0	0.00 *		0	0	0.00
Ceiling Loa		0	0				0.00 *		0	0.00 *		0	0	0.00
Outside Air		0	0	0			).00 *		0	0.00 *		0	0	0.00
Sup. Fan He							2.00 *			0.00 *			0	0.00
Ret. Fan He			` 0				).00 *			0.00 *			0	0.00
Duct Heat P			0				* 00.0			0.00 *			0	0.00
OV/UNDR Siz	-	0	_	_			).00 *		0	0.00 *		0	0	0.00
Exhaust Hea			0	-			* 00.0			0.00 *			0	0.00
Terminal By	pass		0	0		0 (	* 00.00 *			0.00 *			0	0.00
Grand Total	==>	0	0	0		0 (	).00 *		0	0.00 *		715	-6,715	100.00
A STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STA											•			
TANA T			C00									AREA		
41 45			Sens Cap.				3/W8/KR		-	B/WB/HR	Gross To		Glass (sf	(%)
Main Clg	Tons)	(Mbh)	(Mbh)	(cfm)	Deg F					Grains	Floor	2,544		
Aux Clg	0.0 0.0		0.0								Part			
	0.0	0.0 0.0	0.0 0.0	0	0.0 0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
•	0.0	0.0	0.0	U	0.0	0.0	0.0	0.0	0.0	0.0	Roof	0		0 0
Jugas	0.0	0.0									Wall	0		0 0
() 	HEATING	COIL SEL	ECTION			AIRFLOW	IS (cfm)			NGINEERING	CHECKS	TEMF	PERATURES	(F)
C.	apacity			Lvg	Type	Coo!	ing	Heating	Clo	, % OA	0.0	Тура		
		(cf		Deg F	Vent		0	0		Cfm/Sqft		SADB	_	_
	-6.7			71.4	Infil		0	0	Clg	Cfm/Ton	0.00	Plenum		
_	0.0		0.0	0.0	Supply		0	1,835	Clg	Sqft/Ton	0.00	Return		
Preheat	0.0		0 0.0	0.0	Mincfm		0	0	Clg	Btuh/Sqft	0.00	Ret/OA		
Reheat	0.0		0.0	0.0	Return		0	1,835	No.	People	0	Runarr	nd <b>0.</b> 0	<b>68.</b> 0
Humidif	0.0		0 0.0	0.0	Exhaust		0	0		} % OA		Fn Mtr	TD 0.0	0.0
Opt Vent	0.0		0.0	0.0	Rm Exh		0	0	_	Cfm/SqFt		Fn Blo	0.0 dTb	0.0
Total	-6.7				Auxil		0	0	Htg	Btuh/SqFt	-2.64	. Fn Fri	ict 0.1	0.0

System 5 Block DD - DOUBLE DUCT

\* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1 Peaked at Time ==> Mo/Hr: 7/14 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 OAD8: 91 OAD8: 4 Space Ret. Air Ret. Air Net Percnt \* Space Percnt \* Space Peak Coil Peak Percnt Sens.+Lat. Sensible Latent Total Of Tot \* Sensible Of Tot \* Space Sens Tot Sens Of Tot Envelope Loads (Btuh) (Btuh) (Btuh) (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) \* (Btuh) (%) ( (%) \* (8tuh) 0.00 \* 0 0 0.00 \* 0 0.00 \* 0 0.00 \* 0 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0 0 0 Skylite Solr 0 0 Skylite Cond 0 0 4,840 0 4,161 0 0 32,290 0 Roof Cond Glass Solar 17,909 Glass Cond 4,840 - Glass Solar Wall Cond - 0 0.00 \* 0 0.00 \* 0 0.00 \* 0 0.00 \* 0 0.00 0 0.00 Partition 0 526 Exposed Floor Infiltration 32,290 32,290 4.43 \* 16,324 6.23 \* -67.403 -67.403 29.70 Sub Total::> 73,686 74,213 10.19 \* 59,619 22.76 \* -157,056 -159,300 70.19 Internal Loads 0 0 0 0 -1,375 171,180 23.50 \* 180,521 Lights 171,180 0
People 30,203 0 68.92 \* 0 0.00 People Misc 30,203 4.15 \* 14,612 5.58 \* 0.00 0.00 \* 0 0.00 \* 0 0 0 0.00 201,383 27.65 \* 195,133 74.50 \* 0 0 0.00 \* 1,553 0.59 \* -4,627 278.822 38 28 \* 0 0.00 \* Sub Total==> 201,383 0.00 Ceiling Load 1,375 -1,375 0 0.00 0 0 Outside Air 0 278,822 38.28 \* 0 0.00 \* 0 0.00 158,470 21.76 \* Sup. Fan Heat 0.00 \* 0.00 Ret. Fan Heat 19,809 19,809 2.72 \* Ret. ran no...

Duct Heat Pkup

OV/UNDR Sizing 5,616

Exhaust Heat -9,934 0 -9,934 -1.36 +

0 0 0 -0.00 \*

\* Grand Total==> 282,060 9,026 0 728,377 100.00 \* 261,921 100.00 \* -229,331 -226,948 100.00 Total Capacity Sens Cap. Coil Airfl Entering DB/W8/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 27,121 728.4 558.1 27,856 80.4 68.5 88.1 61.1 60.7 80.8 Part Main Clg 60.7 0 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 ExFlr 0.0 0 0.0 0.0 0.0 0.0 0.0 Roof Aux Clg 0.0 Opt Vent 0.0 0.0 0 0 0.0 0.0 0.0 0.0 0.0 0.0 Roof 0.0 8,563 Totals 60.7 728.4 Wall 1,613 460 29 Capacity Coil Airfl Ent Lvg Type Cooling Heating Clg % OA 30.0 Type Clg Htg (Mbh) (cfm) Deg F Deg F Vent 8,357 O Clg Cfm/Sqft 1.03 SADB 66.4 75.6 

 27,856
 61.1
 75.6
 Infil
 968
 968
 Clg Cfm/Ton
 458.93
 Plenum

 0
 0.0
 0.0
 Supply
 27,856
 27,856
 Clg Sqft/Ton
 446.82
 Return

 27,856
 48.4
 61.1
 Mincfm
 0
 0
 Clg Btuh/Sqft
 26.86
 Ret/OA

 0
 0.0
 0.0
 Return
 27,856
 27,856
 No. People
 65
 Runarnd

 Main Htg -437.5 27,856 61.1 75.6 75.4 66.5 0.0 Aux Htg 76.1 67.5 -385.1 27,856 Preheat 80.4 67.5 0.0 Reheat 75.0 68.0 0 0.0 0.0 Exhaust 8,357 0 Htg % OA 0.0 Fn MtrTD 1.3 1.3 0 0.0 0.0 Rm Exh 0 0 Htg Cfm/SqFt 1.03 Fn BldTD 1.0 1.0 Auxil 0 0 Htg Btuh/SqFt -30.33 Fn Frict 2.9 2.5 Humidif 0.0 Opt Vent 0.0 -822.6 Total

System 6 Block DD - DOUBLE DUCT

				PEAK ****	*******	******								*****
Peaked a			Mo/Hr:						/Hr: :	•		Mo/Hr: 1	•	·
outside	Alr ==>	UA	מא/מע/מע:	91/ 74/105.	U		*	0/	408: '	91 * *		OAD8:	4	
		Space	Ret. Air	Ret. Air	Net	: Percn	*	St	pace	Percnt *		eak Coil	Peak	Percnt
	5	Sens.+Lat.	Sensible		Total			Sensi		Of Tot *	•			Of Tot
Envelope		(Btuh)	(Btuh)		(Btuh)		) *		tuh)	(%) *	•		tuh)	(%)
Skylit		Ò	Ó		()			\-	0	0.00 *	•	0	0	0.00
Skylit		0	0		(				0	0.00 *		0	0	0.00
Roof C		14,486	0		14,486			16	,221			286 -48	•	21.28
Glass		17,909	0		17,909				, 285	6.22 *	,	0	0	0.00
Glass		4,840	0		4,840				,167			=	,690	10.88
Wall C		4,161	526		4,687			5		2.15 *		677 <b>-</b> 18	-	8.34
Partit		0	-		- (				0	0.00 *		_	0	0.00
	d Floor	0			Č				0	0.00 *		-		0.00
Infilt		32,290			32,290				,324			403 -67		29.70
Sub To		73,686	526		74,213				,619				•	70.19
Internal			010		, ,, ,, ,	. 10.1	*	<b>J</b> ,	,017	*	•	VJ0 1J/	,000	70.17
Lights		171,180	0		171,180	23.50	) *	180	,521	68.92 *		0	0	0.00
People		30,203			30,203			14.		5.58 *		Λ	0	0.00
Misc		0	0	0	00,200				0	0.00 *		٨	٨	0.00
Sub To	tal::>	201,383	0	•	201,383				,133			٨	٨	0.00
		1,375	-1,375	_	201,000			1,3,		0.59 *		427	٨	0.00
		0	0		278,822				, 555	0.00 *	,	0	۸	0.00
Sup. Fan		•	v	V	158,470				U	0.00 *		V	۸	0.00
Ret. Fan			19,809		19,809					0.00 *			٨	0.00
Duct Heat			17,007		17,007					0.00 *			۸	0.00
OV/UNDR S		5,616	v		5,616			ς	616	2.14 *		648 -67	648	29.81
Exhaust I	-	3,010	-9,934	0	-9,934			٠,	,010	0.00 *	,	U40 - <b>0</b> 7	,040 A	0.00
Terminal			7,704		7,70					0.00 *			٥	0.00
701 111111111	0) 5433		·	•	•	V. 0	*			*			V	0.00
Grand Tot	tal==>	282,060	9,026	0	728,377	100.00	*	261,	,921			331 -226	,948	100.00
				LING COIL S Coil Airfl						B/WB/HR	Change Total	AREAS-		
	(Tons)		(Mbh)	(cfm)						Grains			ss (sf	) (8)
Main Clg	60.7	728.4	558.1	27,856	80.4 6	-	8.1	61.1			Part	27,121		
Aux Clg	0.0		0.0	27,000			0.0	0.0	0.0	0.0	ExFlr	0		
				0			0.0	0.0	0.0	0.0	Roof	0 577		Λ Λ
Totals	0.0 60.7	728.4	V.V	V	V.V	0.0	0.0	0.0	0.0	0.0	Wall			0 0 60 <b>2</b> 9
,			•								Mall	1,613	41	50 29
	HFΔTTN	IG COTI SEL	FCTTON			RELOWS (	rfm)		5	NGINEERING	רחבייגפ"-	TCMOEO	ATHEC	/r\
	Canacit	v Coil A	irfl Ent	Lva	Type	Cooling	. C I III ) 1	Heating	ስ ነ <u>.</u>	, % OA		TEMPER		
	(Mhh)	(cf	m) Deg F	Deg F	Vent	_			_	Cfm/Sqft		Type	Clg	-
Main Htg	-245.	•	856 67.5		Infil	968		968		Cfm/3qrc Cfm/Ton		SAD8 Planum	66.4	
Aux Htg	0.			0.0	Supply	27 RSA		27,856	-	Sqft/Ton		Return	75.4	
Preheat	-385.					21,030		27,036		; Sqit/ion ; Btuh/Sqft			76.1	
Reheat	-Jaj. 0.		0.0	0.0	Return			27,856	-			Ret/OA Runarnd	80.4	
Humidif	0.		0 0.0	0.0		8,357			ut.	People			75.0	
Opt Vent	0.		0 0.0	0.0	Rm Exh	0,337	١	0	กะว	j % OA j Cfm/SqFt	1 07	Fn MtrTD		
Total	-630.		0 0.0	V. V	Auxil	(		0	1110	; cim/sqrt ; Btuh/SqFt		Fn BldTD Fn Frict		1.0
10641	. 000	U			UNVII		'	V	กเร	y acumyour t	-79,73	. ru riict	2.9	2.9

BUILDING U-VALUES - ALTERNATIVE 1 REPLACE FLUORESCENT LAMPS

-----BUILDING U-VALUES-----

					000	m 11-V-11	1100				Room	Room
						/hr/sqf					Mass	Capac.
Room				Summr	Wintr	71117341	Summr	Wintr			(1b/	(Btu/
Number	Description	Part.	ExFlr		Skylt	Roof		Windo	Wall	Ceil.	sqft)	sqft/F)
				-								
1		0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	<pre>1 Total/Ave.</pre>	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
. 4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	<pre>1 Total/Ave.</pre>	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.310	0.837	0.257	0.317	29.4	5.93
.11		0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	<pre>11 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
12	STAIRS W ROOF	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
Zone	<pre>12 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.083	0.810	0.837	0.229	0.000	146.4	31.13
System	<ol><li>3 Total/Ave.</li></ol>	0.000	0.000	C.000	0.000	0.088	0.810	0.837	0.256	0.317	74.1	15.63
. 13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	13 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
	- 4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	14 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
- 15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	<pre>15 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	<pre>16 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
Buildin		0.229	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	52.6	10.93

BUILDING AREAS - ALTERNATIVE 1 REPLACE FLUORESCENT LAMPS

----- BUILDING AREAS -----

•													
				Floor	Total		Exposed			•			, 44 , 44
		Numb	ernf	Area/Dupl		Partition		·Skylight	Skl	Net Roof	Mindom	Win	Net Wall
Room			icate	Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number		Flr		(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
HUMDGI	Description	1 1 1	IVBI	(3411)	(3410)	(3410)	(3411)	(34:0)	(0)	(5411)	(34(6)	(0)	(3910)
1	SUB BSMT, BSMT W	1	1	45,125	45,125	13,222	0	0	0	0	0	0	0
Zone	<pre>1 Total/Ave.</pre>				45,125	13,222	0	0	0	0	0	0	0
4	BSMT E	1	1	12,424	12,424	3,348	0	0	0	0	0	0	0
Zone	4 Total/Ave.				12,424	3,348	0	0	0	0	0	0	0
System	1 Total/Ave.				57,549	16,570	0	0	0	0	0	0	0
-	TOILETS, KITCHEN	1	1	3,520	3,520	. 0	0	0	0	0	21	11	174
Zone	2 Total/Ave.			,	3,520	0	0	0	0	0	21	11	174
11	TOILETS W ROOF	1	1	580	580	0	0	0	0	580	0	0	0
Zone					580	0	0	0	0	580	0	0	0
System	2 Total/Ave.				4,100	0	0	0	0	580	21	11	174
	STAIRS	1	1	560	560	0	0	0	0	0	255	29	625
Zone	3 Total/Ave.				560	0	0	0	0	0	255	29	625
	1ST FL OFFICES		1	11,724	11,724	0	0	0	0	0	1,573	19	6,530
Zone	5 Total/Ave.		•	22,121	11,724	Ŏ	0	0	0	0	1,573	19	6,530
	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	Ö	0	1,610	17	7,730
Zone	7 Total/Ave.		•	14,400	14,400	0	0	0	0	0	1,610	17	7,730
	3RD FL OFFICES	1	1	14,400	14,400	0	0	. 0	0	14,400	1,610	17	8,010
Zone			•	14,400	14,400	0	0	- 0	0	14,400	1,610	17	8,010
	STAIRS W ROOF	1	1	280	280	0	0	0	0	280	105	25	307
Zone	12 Total/Ave.	-	•	100	280	0	0	0	0	280	105	25	307
System	3 Total/Ave.				41,364	0	0	0	0	14,680	5,152	18	23,202
•	SUPPLY STORAGE	1	1	2,544	2,544	1,632	0	0	0	14,000	0,132	0	23,202
	13 Total/Ave.	1	1	2,544	2,544	1,632	0	0	0	Ö	0	0	ő
System	4 Total/Ave.				2,544	1,632	0	0	0	Ŏ	0	0	° l
	1ST FL CEN OFFCS	1	1	9,884	9,884	1,032	0	0	0	0	250	19	1,038
	6 Total/Ave.	1	1	7,004	9,884	0	0	0	0	0	250	19	1,038
	2ND FL CEN OFFCS	1	1	8,674	8,674	0	Ŏ	0	0	0	105	66	55
Zone	8 Total/Ave.	1	•	0,074	8,674	0	0	0	0	0	105	66	55 55
	3RD FL CEN OFFCS	1	1	8,563	8,563	Ö	0	0	0	8,563	105		60
5. 5.	10 Total/Ave.		1	0,303	8,563	0	0	0	0	8,563	105	64 64	
. *	5 Total/Ave.	,			27,121	0	.0	0	0	8,563	460		60
System		1	1	9,884		0	•		•	•		29	1,153
	1ST FL CEN OFFCS	ī	1	7,004	9,884		0	0	0	0	250	19	1,038
Zone	14 Total/Ave.	,	1	0 (74	9,884	0	0	0	0	0	250	19	1,038
15	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	55
Zone	15 Total/Ave.	4	1	0 [/7	8,674	0	0	0	0	0 5/7	105	66	<b>5</b> 5
	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	16 Total/Ave.				8,563	0	0	0	0	8,563	105	64	60
System	6 Total/Ave.				27,121	0	0	0	0	8,563	460	29	1,153
Buildin	g				159,799	18,202	0	0	0	32,386	6,095	19	25,681

ASHRAE 90 ANALYSIS - ALTERNATIVE 1 REPLACE FLUORESCENT LAMPS

ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F) Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F) Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 24.46 (8tu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1 REPLACE FLUORESCENT LAMPS

#### System Totals

Percent	Cool	ing Loa	ad	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.		Hours	Capacity	Hours	Hours	Cap.		Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	17.4	0	0	-204,112	17	229	6,544.3	0	0	0.0	0	0
5 - 10	34.9	1	12	-408,224	6	82	13,088.7	0	0	0.0	0	0
10 - 15	52.3	11	122	-612,336	_ 5	72	19,633.1	0	0	0.0	0	0
15 - 20	69.7	8	88	-816,448	6	73	26,177.4	0	0	0.0	Ô	0
20 - 25	87.2	8	87	-1,020,560	2	31	32,721.7	0	0	0.0	0	0
25 - 30	104.6	9	91	-1,224,672	7	87	39,266.1	0	0	0.0	0	0
30 - 35	122.0	18	191	-1,428,784	8	102	45,810.5	0	0	0.0	0	0
35 - 40	139.5	9	99	-1,632,896	26	344	52,354.8	0	0	0.0	0	0
40 - 45	156.9	6	67	-1,837,009	14	182	58,899.2	0	0	0.0	0	0
45 - 50	174.3	3	27	-2,041,121	9	114	65,443.5	0	0	0.0	Ô	0
50 - 55	191.8	4	44	-2,245,233	0	0	71,987.9	0	0	0.0	0	0
55 - 60	209.2	4	42	-2,449,345	0	0	78,532.2	0	0	0.0	0	0
60 - 65	226.6	3	35	-2,653,457	0	0	85,076.6	0	0	0.0	0	0
65 - 70	244.1	9	95	-2,857,569	0	0	91,620.9	0	0	0.0	0	0
70 - 75	261.5	6	60	-3,061,681	0	0	98,165.3	0	0	0.0	0	Ô
75 - 80	278.9	1	10	-3,265,793	0	0	104,709.6	0	0	0.0	0	0
80 - 85	296.4	0	0	-3,469,905	0	0	111,254.0	0	0	0.0	0	Ô
85 - 90	313.8	0	0	-3,674,018	0	0	117,798.3	100	2,520	0.0	0	n
<b>9</b> 0 ~ 95	331.3	0	0	-3,878,130	0	0	124,342.7	0	0	0.0	0	ň
95 - 100	348.7	0	0	-4,082,242	0	0	130,887.0	Ö	0	0.0	0	0
Hours Off	0.0	0	7,690	0	0	7,444	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
REPLACE FLUORESCENT LAMPS

N_2					DILT	1 N T	N C	тги	0 - 0	A T 11		p 0 c	T 1 F				
					801	LDI	N G	TEM	PEK	AIU	K E F	RUF	1 L E	5			
Temperature	~~~~									Zone N	umber						
Range (F)	1	4	2	11	3	5	7	9				8	10	14	15	16	
Max. Temp.	81.3	80.3	189.2	117.0	86.4	85.0	84.7	83.2	85.3	94 4	85.0	87.5	84.4	85.0	87 5	84 4	
Mo./Hr.			9 18		7 20	7 24		7 21			7 3			7 3	10 2	7 6	
Day Type	2					1	1	4	4	2	. 5	2	5	5		5	
ng silagan Mgaggaran									ki u	mber o	f Unur	•					
Above 100	0	۰۰۰۰۰	7,727	7 207	0	۸	- 0	0	_				۰۰۰۰۰	0	۰۰۰۰۰	۰۰۰۰۰۰	1 AM
95 - 100	0		289	•		-		0	•	•	•	•	•	•	•	۸	
90 - 95	0					-	-	-	_	1,533	•	٥	. 0		-	-	
85 - 90	0	-	•	1,171		•	•			1,634		306	•	•	•	0	* 3 %
80 - 85	238	-			1,161		-	•						•		1,449	v jeh
75 - 80		2,694														3,774	
70 - 75		3,922			635		596			1,403			1,170			1.033	
65 - 70		1,712			1,387					-	-		1,706	•		1,744	· "
60 - 65		356			1,106									600			
55 - 60	0																
50 - 55	0	0	0	0					655	0			0				
Below 50	0			0	1,034						0	0					•
Min. Temp.	62.9	62.1	68.0	62.0	34.0	34.6	34.6	37.3	35.5	61.1	50.2	67.8	57.3	50.0	67.8	57.1	
Mo./Hr.	1 8			2 7	2 11	2 7	2 7	2 7	2 7	1 7	2 7	1 7	1 7	2 7	1 7	1 7	
Day Type	5	5	1	5	4	5	5	5	5	5	5	1	5	5	1	5	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1 REPLACE FLUORESCENT LAMPS

------ MONTHLY ENERGY CONSUMPTION-----

	ELEC	DEMAND	STEAM		STEAM DMND
	Off Peak	On Peak	On Peak	WATER	On Peak
Month	(kWh)	(kW)	(Therm)	(1000 Gl)	(Thrm/hr)
Jan	155,374	771	12,323	0	72
Feb	140,577	771	11,801	0	72
March	169,595	771	9,001	0	68
April	142,010	771	2,412	0	48
May	182,073	901	0	66	0
June	188,324	962	0	108	. 0
July	187,009	1,016	0	183	0
Aug	198,135	970	0	120	0
Sept	165,886	924	0	62	0
0ct	154,686	771	1,462	0	47
Nov	144,710	771	4,799	0	62
Dec	147,976	771	10,498	0	72
Total	1,976,354	1,016	52,296	538	72

Building Energy Consumption =

74,937 (Btu/Sq Ft/Year) 170,281 (Btu/Sq Ft/Year)

Source Energy Consumption =

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
REPLACE FLUORESCENT LAMPS

----- EQUIPMENT ENERGY CONSUMPTION-----

	Equip Code	Jan	Feb	Mar	Apr	Mon May	thly Con June	sumption July	Aug	Sep	0ct	Nov	Dec	Total
0	LIGHTS ELEC PK	70929 369.1	64174 369.1	77685 369.1	67552 369.1	74307 369.1	<b>743</b> 07 <b>369</b> .1	67552 369.1	77685 369.1	67552 369.1	74307 369.1	67552 369.1	67552 369.1	851,153 369.1
1	MISC LD ELEC PK	0.0	0.0	0.0	0.0	_ 0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0
2	MISC LD GAS PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0
3	MISC LD OIL PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0 0.0	0.0	0.0	0.0	0
4	MISC LD P STEAM PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
. 5	MISC LD P HOTH20 PK	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0
	MISC LD P CHILL PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
1	EQ1001S		2-81	TG CTV <	555 TONS									
	ELEC PK	0.0	0.0	0.0	0.0	13021 100.8	19272 162.4	33325 216.2	21399 170.3	12203 123.9	0.0	0.0	0.0	99,220 216.2
1	EQ5100		COOL	ING TOWE	ER									
	PK PK	0.0	0.0	0.0	0.0	5115 23.3	5115 23.3	4650 23.3	5348 23.3	4650 23.3	0.0	0.0	0.0	24,878 23.3
	EQ5100		COGL	ING TOW	ER									
3 M 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	WATER PK	0.0	0.0	0.0	0.0	66 0.6	108 0.9	183 1.1	120 0.9	62 0.7	0.0	0.0	0.0	538 1.1
1	EQ5001		CHIL	LED WATE	ER PUMP	C.V.								
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010		CON	DENSER WA	ATER PUM	P C.V.								
	ELEC PK	0.0	0.0	0.0	0.0	6562 29.8	6562 29.8	5966 29.8	6860 29.8	5966 29.8	0.0	0.0	0.0	31,916 29.8
1	EQ5300		CONT	TROL PAN	EL & INT	ERLOCK								

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
REPLACE FLUORESCENT LAMPS

KEP	LHUE FLUUKE	SUCHI LAMP	2											4
	ELEC PK	0.0	0.0	-	0.0	220 1.0	220 1.0	200 1.0	230 1.0	200 1.0	0.0	0.0	0.0	1,070
2	EQ1000		PR	EVENTS CO	DOLING EN	ERGY								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5001		СН	ILLED WA	TER PUMP	C.V.								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5010		CO	NDENSER V	VATER PUMI	P C.V.								
	ELEC	0	0	•	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ4003		FC	CENTRIF.	FAN C.V									
٠.	ELEC	9754	8825	10683	9290	10219	10219	9290	10683	9290	10219	9290	9290	117,051
	PK	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4
1	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	2276	2059	2493	2168	2384	2384	2168	2493	2168	2384	2168	2168	27,312
	PK	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
2	EQ4003		FC		FAN C.V.									
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003				FAN C.V.									
	ELEC	13975	12644	15305	13309	14640	14640	13309	15305	13309	14640	13309	13309	167,695
	PK	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5
3	EQ4003				FAN C.V.									
tiya",	ELEC PK	1747 8.3	1580	1913	1664	1830	1830	1664	1913	1664	1830	1664	1664	20,962
	. ۲۸	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
5	EQ4003				FAN C.V.									
	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	19076	240,355
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
5	EQ4003				FAN C.V.									
	ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	30,044
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	-11.9	11.9	11.9	11.9	11.9	11.9
6	EQ4003				FAN C.V.									i
	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	19076	240,355
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
6	EQ4003				FAN C.V.									
	ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	30,044
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
1	EQ2101				ISTRICT S	TEAM								
	P STEAM	2112	2023	1529	401	0	0	0	0	0	239	818	1799	8,920
	PK	12.3	12.3	11.7	8.2	0.0	0.0	0.0	0.0	0.0	8.0	10.6	12.3	12.3
1	EQ5020		HEA	T WATER	CIRC. PUM	P C.V.						٠	-	

Trane Air Conditioning Economics

By: Trane Customer Direct Service Network

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1 REPLACE FLUORESCENT LAMPS

	ELEC	6264	5667	6294	2267	0	0	0	0	0	1909	3937	5966	32,304
	PK	29.8	29.8	29.8	29.8	0.0	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8
1	EQ5061		COND	ENSATE R	ETURN PU	ΜP								NA.
	ELEC	117	106	118	42	0	0	0	0	0	36	74	112	604
	PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
2	EQ2101		PURC	HASED DI	STRICT S	TEAM								
	P STEAM	10211	9778	7473	2011	0	0	0	0	0	1223	3981	8699	43,376
	PΚ	59.4	59.4	56.6	39.5	0.0	0.0	0.0	0.0	0.0	38.8	51.3	59.4	59.4
2	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	5220	4723	5717	2784	- 0	0	0	0	0	2138	3778	4971	29,331
	PK	24.9	24.9	24.9	24.9	0.0	0.0	0.0	0.0	0.0	24.9	24.9	24.9	24.9
2	EQ5061		COND	ENSATE R	ETURN PU	MP								
	ELEC	26	23	28	14	0	0	0	0	0	11	19	25	145
	PΚ	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
3	EQ2000		PREV	ENT SUM	OF HEAT	ENERGY								,
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	ÞΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ5020		HEAT	WATER C	IRC. PUMI	P C.V.								
	ELEC	0	0	0	ð	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

# UTILITY PEAK CHECKSUMS - ALTERNATIVE 1 REPLACE FLUORESCENT LAMPS

	U	Ţ	]	[	L	Ι	T	Υ		P	Ε	Α	×	( 1	C	H	Ε	C	į	(	S	U	M	S	
--	---	---	---	---	---	---	---	---	--	---	---	---	---	-----	---	---	---	---	---	---	---	---	---	---	--

Utility	ELECTRIC	DEMAND
---------	----------	--------

Peak Value 1,016.0 (kW)
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

Eqp. Ref. Num. Cooling Eq	Equipment Code Name uipment			Equipment	Description	Utility Demand (kW)		
1	EQ1001S	2-STG CTV	<555 T	ONS		300.1	29.54	
Sub Total						300.1	29.54	
Sub Total						0.0	0.00	
Air Moving	Equipment							
1 3 5 6		SUMMATION SUMMATION	OF FAN	ELECTRICAL ELECTRICAL ELECTRICAL ELECTRICAL	DEMAND DEMAND	57.3 74.9 107.3 107.3	7.37 10.56	
Sub Total						346.8	34.13	
Sub Total						0.0	0.00	
Miscellaned Lights Base Utili Misc Equip Sub Total	ities					369.1 0.0 0.0 369.1	0.00	
Grand Total						1,016.0	100.00	

ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES
BUILDING 122

Weather File Code: CARLISLE Location: ENERGY SAVINGS OPPORTUNITY STUDY Latitude: 40.2 (deg) Longitude: 77.2 (deg) Time Zone: Elevation: 5 Elevation: 475 (ft) Barometric Pressure: 29.2 (in. Hg) Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) Summer Design Wet Bulb: 72 (F) Winter Design Dry Bulb: 4 (F) Summer Ground Relectance: 0.20 Winter Ground Relectance: 0.20 Air Density: 0.0742 (Lbm/cuft)

Air Specific Heat:

Density-Specific Heat Prod:
Latent Heat Factor:

Enthalpy Factor:

0.2444 (8tu/lbm/F)
1.0882 (8tu-min./hr/cuft/F)
4,790.2 (8tu-min./hr/cuft)
4.4519 (1b-min./hr/cuft)

Design Simulation Period: May To September System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 12: 6:50 2/ 2/94
Dataset Name: CB122B .TM

AIRFLOW - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

Garante Communication (Design Airflow Quantities)

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	TRH	10,853	36,175	36,175	36,175	10,853	0	0
2	SZ	0	17,730	17,730	17,730	0	0	17,730
3	INDFP	5,830	19,435	19,435	36,448	19,435	- 34,201	. 0
4	UH	0	0	1,835	0	. 0	0	0
5	DD	8,357	27,856	27,856	- 28,824	27,856	0	0
6	DD	8,357	27,856	27,856	28,824	9,325	0	0
Totals		33,397	129,052	130,887	148,000	67,468	34,201	17,730

CAPACITY - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

System Number	•	Main Sys.	Capacity	ling Opt. Vent Capacity (Tons)	Cooling Totals (Tons)		Aux. Sys. Capacity (Btuh)		Reheat Capacity (Btuh)		Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
Î., 1	TRH	70.7	0.0	0.0	70.7	-68,182	0	-574,205	0	0	0	-642,388
2	SZ	2.6	0.0	0.0	2.6	-9,837	0	-113,011	0	0	. 0	-9,837
3	INDFP	46.4	96.0	0.0	142.4	-680,963	-1,230,942	0	0	0	0	-1,911,905
4	UH	0.0	0.0	0.0	0.0	-6,715	0	0	0	0	0	-6,715
5	DD	57.8	0.0	0.0	57.8	-363,404	0	-409,007	0	0	0	-772,411
. 6	DD	57.8	0.0	0.0	57.8	-245,454	0	-409,007	0	0	0	-654,461
Totals		235.3	96.0	0.0	331.3	-1,374,555	-1,230,942	-1,505,230	0	0	0	-3,997,717

The building peaked at hour 14 month 7 with a capacity of 235.3 tons

ENGINEERING CHECKS - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

ENGINEERING CHECKS-----

e e			Percent		Coo	ling		Heat	ing	
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
277, 641										
1.1:1	Main	TRH	30.00	0.63	511.9	814.3	14.74	0.63	-11.16	57,549
2	Main	SZ	0.00	4.32	6,826.6	1,578.6	7.60	4.32	-2.40	4,100
3	Main	INDFP	30.00	0.47	418.7	891.2	13.46	0.47	-16.46	41,364
3	Auxiliary	INDFP	0.00	0.83	356.2	430.8	27.86	0.83	-29.76	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	00	30.00	1.03	482.0	469.3	25.57	1.03	-28.48	27,121
6	Main	DÐ	30.00	1.03	482.0	469.3	25.57	1.03	-24.13	27,121

System 1 Peak TRH - TERMINAL REHEAT

					*******	*******	****					ATING COIL		*****
Outside	t Time ==> Air ==>		Mo/Hr: 7 DB/WB/HR: 9	•	0		*		/Hr: 7 ADB: 9	•		Mo/Hr: 1. OADB:	3/ <u>1</u> 4	
							*			*			+25	-
		Space		Ret. Air		t Percnt			oace	Percnt *	Space P	eak Coil	Peak	Percnt
		ns.+Lat.	Sensible	Latent	Tota			Sensi		Of Tot *	•	ens Tot :	Sens	Of Tot
Envelope		(8tuh)	(8tuh)	(Btuh)	(Btuh		*	(81	tuh)	(%) *	(Bt	uh) (B	tuh)	(%)
Skylit		0	0			0 0.00			0	0.00 *		0	0	0.00
Skylit		0	0			0 0.00			0	0.00 *		0	0	0.00
Roof C		0	0			0.00			0	0.00 *		0	0	0.00
Glass		0	0			0 0.00			0	0.00 *		0	0	0.00
Glass		0	0			0.00			0	0.00 *		0	0	0.00
Wall C		0	0			0.00			0	0.00 *		0	0	0.00
Partit		18,940			- 18,94			18,	940	4.98 *	-68,		,182	100.00
	d Floor	0				0.00			0	0.00 *		0	0	0.00
Infilt		0 10.040	^			0 0.00		10	0	0.00 *		0	100	0.00
Internal		18,940	0		18,94	0 2.23	, * *	18,	940	4.98 *	-68,	182 <b>-6</b> 8	, 182	100.00
Lights		310,335	0		710 77	5 36.59		720	077	86.83 *		۸	۸	A AA
People		63,941	V		310,33 63,94			329,	097	8.18 *		0	0	0.00
Misc		00,741	0	0		0 0.00		JI,	0	0.00 *		0	۸	0.00
Sub To	tal==>	374,276	0	0	374,27			361.	-	95.02 *		0	۸	0.00
Ceiling		0	0	•		0 0.00		001.	0	0.00 *		Λ	. /	0.00
Outside (		0	0	0	365,08				0	0.00 *		0	0	0.00
Sup. Fan		•	•	•	77,17				•	0.00 *		•	0	0.00
Ret. Fan			18.007		18,00					0.00 *			Ō	0.00
Duct Hea	t Pkup		0			0 0.00				0.00 *			Ō	0.00
OV/UNDR S	Sizing	0				0 -0.00			0	-0.00 *		0	0	0.00
Exhaust I	Heat		-5,402	0	-5,40	2 -0.64	*			0.00 *			0	0.00
Terminal	Bypass		0	0		0.00	*			0.00 *			0	0.00
							*			*				
Grand To	tal==>	393,216	12,605	0	848,07	4 100.00	*	380,	013	100.00 *	-68,	182 -68	,182	100.00
			C00L									AREAS-		
			Sens Cap.			ing D8/WB				/WB/HR	Gross To		ss (sf	) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	-	eg F Gra		-	•	Grains	Floor	57,549		
Main Clg	70.7	848.1	631.1	36,175			7.8	63.4	61.3	80.2	Part	16,570		·
Aux Clg	0.0	0.0 0.0	0.0 0.0	0	0.0 0.0		0.0	0.0	0.0	0.0	ExFlr	0		
Opt Vent Totals	70.7	848.1	0.0	U	0.0	0.0	0.0	0.0	0.0	0.0	Roof	0		0 0
-101013		070.1									Wall	0		0 0
	HEATING	COTI SELI	ECTION		Δ	IRFLOWS (	cfml.			NGINEERING	CHECKS	TEMPER	THOSE	(5)
of the second of					Туре			Heating		% OA		Type	Clg	
Main Uta	(Mbh)	(cfi	n) Deg F		Vent			0	C19	Cfm/Sqft		SADB	65.3	
nain neg	00.2		175 68.0	49 7	Infil	٥		Λ.	010	Cfm/Ton		Plenum	75.0	
Aux Htg	0.0		0 0.0	0.0	Supply	74 175		36.175	Cla	Sqft/Ton		Return	75.5	68.0
Preheat			175 48.8	63.4	Mincfm Return	36.175				8tuh/Sqft		Ret/OA	80.0	
Reheat	-0.0	,	0.0	0.0	Return	36,175	ı	36,175 0	No.	People		Runarnd	75.0	II.
Humidif			0.0	0.0	Exhaust	10,853	;			% OA	0.0	Fn MtrTD		0.5
Opt Vent	0.0		0.0	0.0	Rm Exh	0		0	Htg	% OA Cfm/SqFt	0.63	Fn 81dTD		0.4
Total	-642.4				Auxil	0	l	0	Htg	Btuh/SqFt	-11.16	Fn Frict		1.1
												•		

	System	2	Peak	SZ	- SINGLE	ZONE										
															50 T	
	*******	******	*******	OOLING COIL	PEAK ****	******	****	******	***	*** CLG S	PACE	PEAK ****	***** HEA	TING COIL	PEAK *	******
	Peaked at	t Time =	:=>	Mo/Hr: 7	7/16				*	Mo/H				Mo/Hr: 1		
	Outside A	Air ==>	0A	DB/WB/HR: 9	91/ 73/ 98.	0			*	•	8: 9	•		OADB:		
Agency free	mining. Ny fisiana								*			*			•	-
			Space	Ret. Air	Ret. Air	1	Net 1	Percnt	*	Spa	ce	Percnt *	Space Pea	ak Coil	Peak	Percnt
	N. Bayer		Sens.+Lat.	Sensible	Latent			of Tot		Sensib		Of Tot *	-			Of Tot
	Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Bti		(%)		(Btu		(%) *			tuh)	(%)
A ALCOHOL	Skylite	e Solr	0	Ó	, ,	•	Ó	0.00		(	0	0.00 *		0	0	0.00
	Skylite		0	0			0	0.00			0	0.00 *		0	0	0.00
	Roof Co		0			8	360	2.76			Ō	0.00 *		-	,224	44.57
100	Glass S		595	0			595	1.91		5	95	2.12 *		0	0	0.00
	Glass C		239	0			239	0.77			39	0.85 *		-	,139	15.75
i je je je i do	Wall Co		747	183			929	2.98			47	2.66 *	,		,870	39.68
e de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición dela composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición dela composición de la composición dela composición dela composición de la composición de la composición dela composición dela composición dela composición dela composición dela composición d	Partiti		0	100		•	0	0.00			0	0.00 *		0	,870	0.00
	Exposed		. 0			,	Ö	0.00			0	0.00 *		0	0	0.00
	Infiltr		0				0	0.00			0	0.00 *		0	0	
	Sub Tot		1,581	1,042		2,6	-	8.42		1,5	-	5.63 *		•	,234	0.00
	Internal		1,301	1,042		۷, ۵	123	0.42	*	1,5	01	ა.ია ↑	,	(0 -/,	, 234	100.00
	Lights	Luada	23,831	0		27.0	71	77 16	•	27.0	71	•		^	۸	A AA
. ~	People		4,712	v		23,8		76.46		23,8		84.86 *		0	0	0.00
	Misc		4,712	0	۸	4,7		15.12		2,2		7.92 *		0	0	0.00
	Sub Tot	2]\	28,543	0	0	00.5	0	0.00			0	0.00 *		0	0	0.00
٠	Ceiling L		1,918	-	U	28,5		91.58		26,0		92.78 *		0	0	0.00
	Outside A		1,710	-1,918	^		0	0.00		4	47	1.59 *			0	0.00
	Sup. Fan		U	0	0		0	0.00			0	0.00 *		0	0	0.00
	Ret. Fan			^			0	0.00				0.00 *			0	0.00
	Duct Heat			0			0	0.00				0.00 *			0	0.00
			0	0			0	0.00				0.00 *		_	0	0.00
in akiri.	OV/UNDR S Exhaust H		0	^	^		0	0.00			0	0.00 *		0	0	-0.00
				0	0		0	0.00				0.00 *			0	0.00
A FOREST	Terminal	bypass		0	0		0	0.00	*			0.00 *			0	0.00
	**************************************	-1	70.040	27/		•			*			*				
, <del>1</del> )	Grand Tot	a1==>	32,042	-876	0	31,1	66 1	.00.00	*	28,0	31	100.00 *	-3,66	68 -7,	,234	100.00
		-14.5 <sup>±</sup>		0001												
		****	0		ING COIL S	ELECTION-						tun tun				
			Capacity				-	D8/W8/H			-	/WB/HR	Gross Tota		ss (sf	) (%)
	W-1- 01-	(Tons)		(Mbh)	(cfm)	Deg F				_	_	Grains		4,100		
	Main Clg	2.6		28.7	17,730	76.6	69.0				68.6	99.8	Part	0		
	Aux Clg	0.0		0.0	0	0.0	0.0				0.0	0.0	ExFlr	0		
N.	Opt Vent	0.0		0.0	0	0.0	0.0	0.	. 0	0.0	0.0	0.0	Roof	580		0 0
	Totals	2.6	31.2										Wall	196	2	21 11
The second							. =		. ,	•	_					
			NG COIL SELE						,			NGINEERING		TEMPERA		
	. :		ty Coil Ai			Type		coling		eating		% OA	0.0	Type	Clg	Htg
44.6.28		(Mbh			Deg F	Vent		0		0	-	Cfm/Sqft		SADB	73.5	
	Main Htg	-9	,		68.2	Infil		0		0	-	Cfm/Ton		Plenum	76.5	
·	Aux Htg	0			0.0		1	7,730		17,730	_	Sqft/Ton		Return	79.7	67.7
	Preheat	-113			73.5	Mincfm		0		0	_	Btuh/Sqft		Ret/OA	76.6	67.7
	Reheat		.0	0.0	0.0	Return		0		17,730		People	10	Runarnd	75.0	68.0
	Humidif		.0	0.0	0.0	Exhaust		0		0		% OA	0.0	Fn MtrTD	0.0	0.0
	Opt Vent	0		0.0	0.0	Rm Exh	1	7,730		0		Cfm/SqFt		Fn BldTD	0.0	00
	Total	-9	.8			Auxil		0		0	Htg	Btuh/SqFt	-2.40	Fn Frict	0.0	0.0

System 3 Block INDFP - 4-PIPE INDUCTION

<b>**</b> *******	******	******	OOLING COIL	_ PEAK ****	*******	*******	****	**** CIG S	PACE	PFAK ****	****** HEAT]	יי." ס נדחם מאו	FΔK <b>*</b> *	: 444 ******
Peaked at T								Mo/H				Mo/Hr: 13		
			DB/WB/HR:	91/ 74/105.	0			OAD		•			4	
		Space	Ret Air	r Ret. Air	No	at Barent	*	Sna	ro	* * Percnt	Space Peal	Coil P	nak	Danant
	Se	ens.+Lat.	Sensible		Tota			Sensib		Of Tot *	,			Percnt Of Tot
Envelope Lo			(Btuh)					(Btu		(%) *	•	) (Bt		(\$)
Skylite S			( (		•	0 0.00		(555	-				-	0.00
Skylite C			(							0.00 *	(	)	0	0.00
Roof Cond			21,484		21,95			6	-	0.10 *	-1,579	-73		3.84
Glass Sol					171,92	9.87		185,8		28.25 *				0.00
Glass Con			(	)	53,83			40,0			-276,287		-	14.45
			16,902	2	130,23	7.48				25.69 *				19.74
Partition		0	•		-			,		0.00 *		)		0.00
Exposed F	loor	. 0				0.00			0	0.00 *	(	)	0	0.00
					736,35	42.29	*	170,5	78	25.93 *	-1,184,852			
Sub Total	==> 1	,075,915	38,386	<b>S</b>	1,114,30	1 64.00	*			86.06 *				100.00
Internal Lo							*			*				
		216,053	(	)	216,05	3 12.41	*	62,0	58	9.43 *	(	)	0	0.00
People		45,248	(		45,24	8 2.60	*	6,0	70	0.92 *	(	ı	0	0.00
Misc						0.00	*		0	0.00 *	(	+	0	0.00
Sub Total:				) 0	261,30			68,1		10.36 *			0	0.00
Ceiling Load	d	14,654	-14,654	4 ) 0				23,4		3.57 *		,	0	0.00
Outside Air		0	(	) 0	252,36				0	0.00 *		l	0	0.00
Sup. Fan He					110,56					0.00 *			0	0.00
Ret. Fan He			13,820		13,82	0 0.79				0.00 *			0	0.00
Duct Heat Pl OV/UNDR Siz Exhaust Hea	kup	440	(	)		0.00			3.2	0.00 *			0	0.00
UV/UNDR S12	ing	119	11.54	,	11	9 0.01		1	19	0.02 *		)	0	0.00
Exhaust Hea	Į		-11,266	0		6 -0.65				0.00 *			0	0.00
Terminal By	pass		C	0		0.00	*			0.00 *			0	0.00
Grand Total	\ 1	751 000	0/ 003	, ,	1 741 00	0 100 00	¥ L	/F3 A	· /	*			005	100 00
diana iutai	/ 1	,331,707	20,207	v	1,741,20	0 100.00	*	657,8	36	100.00 +	-1,838,936	-1,911,	703	100.00
				LING COIL S	ELECTION							00506		
學教验以為											Gross Total			
				(cfm)						Grains	- •	.,364	5 (51)	(6)
				19,435							Part	-		
	96.0	1,152.3	709.7	34,201	75.0		5.7		53.1	42.6		0		
Opt Vent		0.0		0			0.0	0.0	0.0	0.0		,680		0 0
Totals			*	•	• • • •			0.10	•••	***		3,354		2 18
		,						•				,	0,10	
	HEATING	COIL SEL	ECTION		А	IRFLOWS (c	cfm)		8	NGINEERING	CHECKS	TEMPERA	TURES	(F)
		Coil A			Type	Cooling		Heating		% 0A		Туре	Clg	Htg
e e	(Mbh)	(cf		_	Vent	-		0	_	Cfm/Sqft		SADB	65.1	96.7
Main Htg	-681.0	19,	435 64.5	_		17,013			Clg	Cfm/Ton	418.73	Plenum	76.1	64.4
Aux Htg -1	1,230.9	34,	201 68.0	101.1		19,435		19,435	Clg	Sqft/Ton	891.20	Return	76.8	64.5
Preheat	-0.0		435 64.5	59.9	Mincfm	. 0		0	Clg	Btuh/Sqft	13.46	Ret/OA	80.9	64.5
	0.0		0.0		Return	19,435		19,435	No.	People	98	Runarnd	75.0	68.0
	0.0		0.0			5,830		0		1 % GA		Fn MtrTD	1.3	1.3
•	0.0		0.0	0.0	Rm Exh	0		0		Cfm/SqFt		Fn BldTD	1.0	1.0
Total -1	1,911.9				Auxil	34,201		34,201	Htg	Btuh/SqFt	-16.46	Fn Frict	2.9	2.5

System 4 Block UH - UNIT HEATERS

													e e perte	
			OOLING COIL		*****	*****	*******							******
C 10 F	t Time ==>		Mo/Hr: 0				*		/Hr: 0	•		Mo/Hr:	13/ 1	
Outside A	ar ==>	UA	DB/WB/HR:	0/ 0/ 0.	0		*	0	AD8:	0 *		OAD8:	4	
Sagital Control		0	D-4 A'-	D . L . A.*			*	_		*				_
	Δ.	Space		Ret. Air			eront *		pace	Percnt *			Peak	Percnt
<b>.</b>		ns.+Lat.	Sensible	Latent			f Tot *			Of Tot *	•		Sens	Of Tot
Envelope		(Btuh)	(8tuh)	(8tuh)	(Bt	uh)	(%) *	•	tuh)	(%) *	•	ih) (	Btuh)	(%)
Skylite		0	0				0.00 *		0	0.00 *		0	0	0.00
Skylite		0	0			0	0.00 *		0	0.00 *		0	0	0.00
Roof Co		0	0			_	0.00 *		0	0.00 *		0	0	0.00
Glass S		0	0			0	0.00 *		0	0.00 *		0	0	0.00
Glass C		0	0			_	0.00 *		0	0.00 *		0	0	0.00
Wall Co		0	0			0	0.00 *		0	0.00 *		0	0	0.00
Partiti		0			-		0.00 *		0	0.00 *	•	15 -	5,715	100.00
Exposed		0					0.00 *		0	0.00 *		0	0	0.00
Infiltr		0	-				0.00 *		0	0.00 *		0	0	0.00
Sub Tot		0	0			0	0.00 *		0	0.00 *		15 -	5,715	100.00
Internal	Loads	_					*			*				
Lights		0	0			0	0.00 *		0	0.00 *		0	0	0.00
People		0	4	-			0.00 *		0	0.00 *		0	0	0.00
Misc	,	0	0	0			0.00 *		0	0.00 *		0	0	0.00
Sub Tot		0	0	0			0.00 *		0	0.00 *		0	0	0.00
Ceiling L		0	0				0.00 *		0	0.00 *		0	0	0.00
Outside A		0	0	0			0.00 *		0	0.00 *		0	0	0.00
Sup. Fan							0.00 *			0.00 *			0	0.00
Ret. Fan			0				0.00 *			0.00 *			0	0.00
Duct Heat			0				0.00 *			0.00 *			0	0.00
OV/UNDR S	-	0					0.00 *		0	0.00 *		0	0	0.00
Exhaust H			0	0			0.00 *			0.00 *			0	0.00
Terminal	Bypass		0	0		0	0.00 *			0.00 *			0	0.00
Grand Tot	al==>	0	0	0		0	0.00 *		0	0.00 *	-6,7	15 -	5,715	100.00
	Y-4-1 A		C00L									AREAS		
	Total C		Sens Cap.			_	B/WB/HR		_	/WB/HR	Gross Tot		ass (si	·) (%)
Moin Cla	(Tons)	(Mbh)	(Mbh)	(cfm)			Grains	~	-	Grains	Floor	2,544		
Main Clg Aux Clg	0.0	0.0	0.0	0			0.0			0.0	Part			
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0		0.0	0.0	ExFlr	0		
		0.0 <b>0</b> .0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	0		0 0
Totals	V.V	0.0									Wall	0		0 0
	HEATING	CUTI SELI	ECTION			ATOCLO	040 /afm			NOTHEROTHE	CHECKO	TCHOC		(5)
	Canacity	Coil A	irfl Ent	Lua				•		NGINEERING		TEMPE		•
			m) Deg F	Deg F	Type Vent			Heating O		% OA Cfm/saft	0.0	Type	Clg	-
	-6.7			71.4	Vent Infil					Cfm/Sqft		SADB	0.0	
Aux Htg	0.0	1,	0.0	0.0	Supply		۷	0 1,835	CI G	Cfm/Ton Sqft/Ton		Plenum Return	0.0	
Preheat	0.0		0 0.0	0.0	Mincfm		0	1,000	619	Sq:t/Ton Btuh/Sqft			0.0	
Reheat	0.0		0 0.0	0.0	Return			1,835		People		Ret/OA	0.0	
Humidif	0.0		0 0.0	0.0	Exhaust			1,835				Runarnd	0.0	
Opt Vent	0.0		0 0.0	0.0	Rm Exh		0	0		% 0A		Fn MtrTl		
Total	-6.7		v v.v	V.V	Auxil		0	0		Cfm/SqFt		Fn BldT(		
10001	-0.7				HUAII		U	U	nig	Btuh/Sqft	-2.64	. Fn Fric	0.1	0.0

5 Block DD - DOUBLE DUCT

<b>***</b> ****	******	****** C(	DOLING COIL	PEAK *****	******	******	***** CLG	SPACE	PEAK ****	***** HEAT	ING COIL PEAK	******
Peaked at			Mo/Hr:					/Hr: 7			Mo/Hr: 13/ 1	9 .
				91/ 74/105.0	)			ADB: 9			OADB: 4	1.55
.*							*		*		2	2
÷		Space	Ret. Air	Ret. Air	Net	Percnt	* 51	oace	Percnt *	Space Pea	k Coil Peak	Percnt
5 15	Se	ns.+Lat.	Sensible	Latent	Total				Of Tot *	Space Sen		
Envelope (		(Btuh)	(8tuh)		(Btuh)	(%)		tuh)	(%) *	(Btuh		
Skylite		. 0	0	, ,	Ò	0.00		Ó	0.00 *	•	o o	
Skylite		0	0		0	0.00		0	0.00 *		0 . 0	
Roof Cor		14,486	0		14,486	2.09		,221			6 -48,286	
Glass Sc		17,909	0		17,909			285	6.84 *		0 0	
Glass Co		4,840	0		4,840	0.70		167			0 -24,690	
Wall Cor		4,161	526		4,687	0.68		622	2.36 *	•	7 -18,921	
Partitio		, O			- 0	0.00		0	0.00 *		0 : 0	
Exposed		0			0	0.00		0	0.00 *		0 0	
Infiltra		31,019			31,019				6.86 *		3 -67,403	
Sub Tota		72,415	526		72,941			619		•		
Internal L		,			-,··-		*	•	*	,	,,,,,,	
Lights	-	148,208	0		148,208	21.37	<b>*</b> 156.	295	65.67 *	4	0	0.00
People		30,203			30,203				6.14 *	1	0 0	
Misc		0	0	0	. 0			0	0.00 *		0 0	
Sub Tota	al::>	178,410	0	0	178,410			907		1	0 0	
Ceiling Lo		•	-1,375		0	0.00			0.65 *	-4,62	7 0	
Outside Ai		•	0	0	267,845			0	0.00 *	,	0 0	
Sup. Fan h	Heat				158,470				0.00 *		O	
Ret. Fan H	Heat		19,809		19,809		*		0.00 *		0	0.00
Duct Heat			. 0		0				0.00 *		O	0.00
OV/UNDR Si		5,938			5,938			938.	2.49 *		8 -67,648	
Exhaust He	eat	·	-9,934	0	-9,934	-1.43	*		0.00 *		· o	
Terminal E	Bypass		0	0	0	-0.00	*		0.00 *		0	0.00
							*		*			
Grand Tota	al==>	258,138	9,026	0	693,479	100.00	<b>*</b> 238,	,017	100.00 *	-229,33	1 -226,948	100.00
(				LING COIL SE	I FOTTON						AREAS	
				Coil Airfl						Gross Tota		sf) (%)
	(Tons)		(Mbh)					_	Grains		7,121	31) (4)
Main Clg	57.8	693.5	575 4	27,856	80.4 68		•	61.4		Part	0	
	0.0	0.0	0.0	0		0.0 0.		0.0	0.0	ExFlr	0	
	0.0	0.0	0.0	0		0.0		0.0	0.0		8,563	0 0
Totals		693.5									1,613	
											,	
)e :	HEATING	COIL SELE	ECTION		AI	RELOWS (of	m)	<b>~</b> ~ E	NGINEERING	CHECKS	TEMPERATUR	ES (F)
Jakoni e vid Nama			irfl Ent			Cooling	Heating		, % OA		Type Cl	
		(cfi				•	0		Cfm/Sqft	1.03		1.1 75.6
	-363.4			-		968	968	-	Cfm/Ton			6.4 66.5
Aux Htg	0.0				Supply	27,856	27,856		Sqft/Ton	469.30		.1 67.5
Preheat	-409.0					0	0	_	Btuh/Sqft			.4 67.5
Reheat	0.0				Return	27,856	27,856	-	People		•	.0 68.0
Humidif	0.0		0.0			8,357	, 0					.3 1.3
Opt Vent	0.0		0.0		Rm Exh	. 0	0	Htg	g % OA g Cfm/SqFt	1.03		.0 1.0
Total	-772.4				Auxil	0	0	Htg	Btuh/SqFt	-28.48		2.9 2.9
								_	· ·	•		

System 6 Block DD - DOUBLE DUCT

													d .	
					*******	*****	*****			E PEAK ****			EAK *	******
		>		7/14			*			7/16 *		Mo/Hr: 13	/ 1	
Outside	Air ==>	0A	DB/WB/HR:	91/ 74/105.	0		*	0	ADB:	91 *		OADB:	4	
		_					*			*				
	_	Space		Ret. Air	Ne	t Perc	nt *	S		Percnt *	•		eak	Percnt
		ens.+Lat.				l Of To	ot *	Sens	ible		•	ns Tot S	ens	Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(8tuh)	(Btuh	i <b>)</b> (1	{}) *	( B	tuh)		(Btu	h) (8t	uh)	(%)
Skylite	e Solr	0	(0000) (0 (0 0 526	)			* 00		0	0.00 *		Ó	0	0.00
Skylite	e Cond	0	(	)	•		00 *		0	0.00 *		0	0	0.00
Roof Co	ond	14,486	C	)	14,48	6 2.	)9 *	16	, 221	6.82 *	-48,2	86 -48,		21.28
Glass (	Solar	17,909	(	)	17,90	9 2.	58 *	16	, 285	6.84 *		0	0	0.00
Glass (	Cond	4,840	C	)	4,84	0 0.	70 *	5	,167	2.17 *	-24,6	90 -24,	690	10.88
Wall Co	ond	4,161 0	526	Ò	4,68	7 0.	<b>68</b> *	5	,622	2.36 *	-16,6	77 -18,	921	8.34
Partit	ion	0			-	0 0.0	× 00		0	0.00 *		0	0	0.00
Expose	d floor	0				0 0.0	00 *		0	0.00 *		0	0	0.00
Infilt	ration	31,019			31,01	9 4.	<b>17</b> *	16	, 324	6.86 *	-67,4	03 -67.	403	29.70
Sub To	tal==>	72,415	52€	•	72,94	1 10.1	52 *			25.05 *		56 -159,		70.19
Internal	Loads						*			*		,		
Lights		148,208	C	}	148,20	8 21.	37 *	156	, 295	65.67 *		0	0	0.00
People		30,203			30,20		36 *			6.14 *		0	Ô	0.00
Misc		0	C	0	,		00 *		0	0.00 *		0	0	0.00
Sub Tot	tal::>	178,410	0		178,41		73 *			71.80 *		0	Ō	0.00
		1,375	-1,379		,		20 *	1		0.65 *		27	0	0.00
Outside A		0	· c	)	267,84		52 *		0	0.00 *		0	0	0.00
Sup. Fan					158,47		35 *		•	0.00 *		·	0	0.00
Ret. Fan			19,809		19,80		36 *			0.00 *			0	0.00
Duct Heat			0			0 0.0				0.00 *			0	0.00
		5,938	C			8 0.8		5	,938	2.49 *		48 -67,	-	29.81
<b>Exhaust</b> l	-	,	-9.934	0	-9,93			·	,	0.00 *	•		- 0	0.00
Terminal	Bypass		-9,934 0	0		0 -0.0				0.00 *			0	0.00
te Tegath	• .						*			*			٧	0.00
Grand Tot	tal==>	258,138	9.026	0	693.47	9 100.0	00 *	238	.017	100.00 *	-229 3	31 -226	948	100.00
		,	,		,				,		227,0		, 10	100.00
			coo	LING COIL S	ELECTION							AREAS		
										8/W8/HR	Gross Tot	al Glas	s (sf	) (%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F D	eg F Gi	rains	Deg F	Deg F	Grains	Floor		٠, ٠,	′ 💜
Main Clg	57.8	693.5	535.4	27,856	80.4	68.7	89.5	61.9	61.4	82.7	Part			
Aux Clg	0.0	0.0	0.0	. 0	0.0	0.0	0.0	0.0	0.0		ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0		Roof	8,563		0 0
Totals	57.8	693.5									Wall	1,613	4	60 29
												-,		
	HEATIN	G COIL SELE	CTION		A	IRFLOWS	(cfm)			ENGINEERING	CHECKS	TEMPERA	TURES	(F)
		y Coil Ai			Type	Coolir		Heating		g % OA	30.0	Туре	Clg	Htg
	(Mbh)				Vent	8,35	-	0		g Cfm/Sqft	1.03	SADB	67.1	
Main Htg	-245.	-		_	Infil	95		968		g Cfm/Ton	482.02	Plenum	75.4	
Aux Htg	0.0		0 0.0		Supply	27,85		27,856		g Sqft/Ton	469.30	Return	76.1	
Preheat	-409.				Minofm			0		g Stuh/Sqft		Ret/OA	80.4	
Reheat	0.0	,	0 0.0		Return	27,85		27,856		. People	65	Runarnd	75.0	
Humidif	0.0		0 0.0		Exhaust	8,35		27,000		g % CA	0.0	Fn MtrTD	1.3	
Opt Vent	0.0		0 0.0		Rm Exh		0	0		g Cfm/SqFt	1.03	Fn BldTD	1.0	
Total	-654.			V. V	Auxil		0	0		g Btuh/SqFt		Fn Frict	2.9	
10001	054.	•			HUNTI		v	V	II C	a prailiadir	۷۳.۱۵	. 111 11111	2.9	4.7

BUILDING U-VALUES - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

		~~~~			Roo	m U-Val	ues				Room	Room
						/hr/sqf					Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof		Windo	Wall	Ceil.	sqft)	sqft/F)
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	<pre>1 Total/Ave.</pre>	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
. 4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	<pre>4 Total/Ave.</pre>	0.229	0.000	0.000	0.000 -	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	<pre>1 Total/Ave.</pre>	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	<pre>11 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
. 12		0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	74.1	15.63
_ 13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	13 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.		0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	<pre>14 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
	15 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	<pre>16 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
Buildin	ıg	0.229	0.000	0.000	0.000	880.0	0.810	0.837	0.256	0.317	52.6	10.93

BUILDING AREAS - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

BUILDING AREAS-----

				Floor	Total		Exposed						
		Numbe	rof	Area/Dupl		Partition	Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room		Dupli		Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number	Description	Flr	Rm .		(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)		(%)	(sqft)
				, , ,	, , ,		( - 1 - 7	4-47	( - /	(-47	(-4/*)	( • )	(04.0)
1	SUB BSMT, BSMT W	1	1	45,125	45,125	13,222	0	0	0	0	0	0	0
Zone	1 Total/Ave.				45,125	13,222	0	0	0	0	0	0	ō
4	BSMT E	1	1	12,424	12,424	3,348	0	0	0	0	0	Ö	ō
Zone	4 Total/Ave.				12,424	3,348	0	0	0	0	0	0.	0
System	1 Total/Ave.				57,549	16,570	0	0	0	0	0	0	Ö
2	TOILETS, KITCHEN	1	1	3,520	3,520	0	0	0	0	0	21	11	174
Zone	<pre>2 Total/Ave.</pre>				3,520	0	0	0	0	. 0	21	11	174
11	TOILETS W ROOF	1	1	580	580	0	0	0	0	580	0	0	0
Zone	<pre>11 Total/Ave.</pre>				580	0	0	0	0	580	0	0	0
<b>S</b> ystem	<pre>2 Total/Ave.</pre>				4,100	0	0	0	0	580	21	11	174
3	STAIRS	1	1	560	560	0	0	0	0	0	255	29	625
Zone	<pre>3 Total/Ave.</pre>				560	0	0	0	0	0	255	29	625
5	1ST FL OFFICES	1	1	11,724	11,724	0	0	0	0	0	1,573	19	6,530
Zone	5 Total/Ave.				11,724	0	0	0	0	0	1,573	19	6,530
7	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	0	0	1,610	17	7,730
Zone	7 Total/Ave.				14,400	0	0	0	0	0	1,610	17	7,730
9	3RD FL OFFICES	1	1	14,400	14,400	0	0	0	0	14,400	1,610	17	8,010
Zone	9 Total/Ave.				14,400	0	0	0	0	14,400	1,610	17	8,010
12	STAIRS W ROOF	1	1	280	280	0	0	0	0	280	105	25	307
Zone	12 Total/Ave.				280	0	0	0	0	280	105	25	307
System	3 Total/Ave.				41,364	0	0	0	0	14,680	5,152	18	23,202
13	SUPPLY STORAGE	1	1	2,544	2,544	1,632	0	0	0	0	0	0	C
Zone	13 Total/Ave.				2,544	1,632	0	0	0	0	0	0	С
System	4 Total/Ave.				2,544	1,632	0	0	0	0	0	0	0
A second control of the control of t	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	6 Total/Ave.				9,884	0	0	0	0	0	250	19	1,038
	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	<b>5</b> 5
Zone	8 Total/Ave.				8,674	0	0	0	0	0	105	66	<b>5</b> 5
	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	10 Total/Ave.				8,563	0	0	0	0	8,563	105	64	60
System	5 Total/Ave.				27,121	0	0	0	0	8,563	460	29	1,153
57.50	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	14 Total/Ave.				9,884	0	0	0	0	0	250	19	1,038
15	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	<b>5</b> 5
Zone	15 Total/Ave.				8,674	0	0	0	0	0	105	66	<b>5</b> 5
	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	16 Total/Ave.				8,563	0	0	0	0	8,563	105	64	60
System	6 Total/Ave.				27,121	0	0	0	0	8,563	460	29	1,153
Buildin	g				159,799	18,202	0	0	0	32,386	6,095	19	25,681

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ASHRAE 90 ANALYSIS - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

----- ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.088 (8tu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.362 (8tu/Hr/Sq Ft/F)
Overall Building U-Value = 0.224 (8tu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 24.46 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2 REPLACE FLUORESCENT BALLASTS

### System Totals

Percent	Cool	ing Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.		Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	16.6	0	0	-205,536	19	257	6,544.3	0	0	0.0	0	0
5 - 10	33.1	1	16	-411,073	2	30	13,088.7	0	0	0.0	0	0
10 - 15	49.7	14	152	-616,609	- 5	69	19,633.1	0	0	0.0	0	. 0
15 ~ 20	66.3	7	80	-822,146	5	69	26,177.4	0	0	0.0	0	0
20 - 25	82.8	12	124	-1,027,682	4	48	32,721.7	0	0	0.0	0	0
<b>25 -</b> 30	99.4	6	68	-1,233,218	7	90	39,266.1	0	0	0.0	0	0
<b>30 -</b> 35	116.0	20	218	-1,438,755	9	118	45,810.5	0	0	0.0	ō	0
35 - 40	132.5	5	50	-1,644,291	22	287	52,354.8	0	0	0.0	0	0
40 - 45	149.1	5	49	-1,849,828	16	207	58,899.2	0	0	0.0	0	0
45 - 50	165.6	3	27	-2,055,364	11	150	65,443.5	0	0	0.0	0	0
<b>50 ~ 5</b> 5	182.2	8	82	-2,260,901	0	0	71,987.9	0	0	0.0	0	0
55 - 60	198.8	2	19	-2,466,437	0	0	78,532.2	0	0	0.0	0	0
60 - 65	215.3	6	65	-2,671,974	0	0	85,076.6	0	0	0.0	0	0
65 - 70	231.9	7	75	-2,877,510	0	0	91,620.9	0	0	0.0	0	0
<b>70 ~</b> 75	248.5	3	35	-3,083,046	0	0	98,165.3	0	0	0.0	0	0
<b>75 -</b> 80	265.0	1	10	-3,288,583	0	0	104,709.6	0	0	0.0	0	0
<b>80 -</b> 85	281.6	0	0	-3,494,119	0	0	111,254.0	0	0	0.0	0	0
85 - 90	298.2	0	0	-3,699,656	Û	0	117,798.3	100	2,520	0.0	0	0
90 - 95	314.7	0	0	-3,905,192	0	0	124,342.7	0	0	0.0	0	0
95 - 100	331.3	0	0	-4,110,729	0	0	130,887.0	0	0	0.0	ō	. 0
Hours Off	0.0	0	7,690	0	0	7,435	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

5 					ד וו ס	L D I	ki o	T F M	n r n	A T II	n r 0			0			
, ·					<b>D</b> U I	LVI	N G	1 6 11	PEK	ATU	K E P	KUr	1 L t	5			grá Por region de 1
<b>Te</b> mperature										Zone N	ımber -						
Range (F)	1	4	2	11	3	5	7	9			6		10	14	15	16	
Max. Temp.	79.7	78.8	175.2	113.1	86.4	84.8	84.5	83.2	85.3	92.4	84.8	86.2	84.3	84.8	86.2	84.3	
Mo./Hr.	10 21	10 24	9 19	8 16	7 20	7 23	7 24	7 21	7 20	8 17	7 2	10 1	7 6	7 2	10 1	76	
Day Type	2	2	2	2	4	1	1	4	4	2	5	2	5	5	2	5	
							,		Nu	mber o	f Hours	S					
Above 100	0	0	7,408	2,729	0	0	- 0	0	0	0	0	0	0	0	0	0	4
95 - 100	0	0	280	1,294	0	0	0	0	0	0	0	0	0	0	0	0	•
90 - 95	0	0	. 328	119	0	0	0	0	0	744	0	0	0	0	0	0	
85 - 90	0	0	24	1,050	118	0	0	0	36	1,581	0	102	0	0	102	0	
80 - 85	0	0	370	462	1,137	1,163	1,128	645	1,141	1,171	1,591	2,544	1,146	1,591	2,507	1,146	
75 - 80	4,707	2,139	350	464	1,764	1,899	1,908	2,297	1,868	1,340	2,913	5,099	3,607	2,957	4,733	3,570	
70 - 75	1,731	3,820	0	516	643	627	636	781	627	1,386	1,131	991	1,204	1,047	1,313	1,084	
65 - 70	1,881	2,084	0	1,646	1,352	1,530	1,548	1,586	1,437	1,580	1,730	24	1,989	1,656	105	2,082	
60 - 65	441	717	0	480	1,105	1,070	1,064	1,365	1,117	958	629	0	537	729	0	567	
55 - 60	0	0	0	0	932	925	952	864	1,008	0	331	0	277	331	0	311	
50 - 55	0	0	0	0	671	664	651	569	663	0	429	0	0	436	0	0	
Below 50	0	0	0	0	1,038	882	873	653	863	0	6	0	0	13	0	0	
Min. Temp.	62.3	61.1	67.9	60.1	34.0	34.5	34.5	37.1	35.5	60.4	49.8	67.7	56.9	49.6	66.8	56.8	
Mo./Hr.	1 9	2 11	1 7	2 7	2 11	2 7	2 7	2 7	2 7	1 7	2 7	1 7	1 7	2 7	2 10	1 7	
Day Type	5	5	1	5	á	5	5	5	5	5	5	1	5	5	5	5	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2 REPLACE FLUORESCENT BALLASTS

------ MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	STEAM On Peak (Therm)	WATER (1000 Gl)	STEAM DMND On Peak (Thrm/hr)
Jan	145,856	722	12,754	0	69
Feb	131,965	722	12,060	0	69
March	158,118	722	9,487	0	69
April	133,044	722	2,677	0	49
May	171,211	844	0	59	0
June	176,857	903	0	- 98	0
July	175,648	954	0	170	0
Aug	186,059	910	0	109	0
Sept	156,023	869	0	56	0
0ct	146,080	722	1,735	0	47
Nov	136,166	722	5,197	0	53
Dec	138,910	722	10,791	0	69
Total	1,855,935	954	54,701	492	69

Building Energy Consumption = 73,870 (8tu/Sq Ft/Year) Source Energy Consumption = 164,571 (8tu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

REPLACE FLUORESCENT BALLASTS

------EQUIPMENT ENERGY CONSUMPTION-------EQUIPMENT ENERGY

Ref	Equip					Man	thly Con	cumntion						
	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
0														
	ELEC PK	61411 319.6	55562 319.6	67259 319.6	58486 319.6	64335 319.6	64335 319.6	58486 319.6	67259 319.6	58486 319.6	64335 319.6	58486 319.6	58486 319.6	<b>7</b> 36,929 <b>3</b> 19.6
	MISC LD													
	ELEC	0	0	0	0	- 0	0	0	0	0	0	0	0	. 0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- i 2	MISC LD													
**	GAS PK	0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0
3		V. V			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	٧.٧	V.V
3	MISC LD OIL	0	0	0	0	0	0	0	ĵ.	0	0	0	0	0
1	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A	MISC LD													
•	P STEAM	0	. 0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
. 5	MISC LD													
•	P HOTH20	0.0	0.0	0.0	0.0	0 0.0	0 0.0	0	0	0	0	0	0	0
t. a. t	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD		•	ċ	•				•	•				
	P CHILL PK	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0							
	. F.										•••		***	V.0
	EQ1001S ELEC	0	2-S1 0	rg ctv <5 0	55 TONS 0	12131	17777	31029	19748	11405	0	0	0	92,089
	PK	0.0	0.0	0.0	0.0	93.5	152.5	204.2	159.8	118.3	0.0	0.0	0.0	204.2
	EQ5100		COOL	.ING TOW	E R									
	ELEC	0	0	0	0	5115	5115	4650	5348	4650	0	0	0	24,878
1	PK	0.0	0.0	0.0	0.0	23.3	23.3	23.3	23.3	23.3	0.0	0.0	0.0	23.3
1	EQ5100			ING TOW										×
	WATER PK	0 0.0	0 0.0	0 0.0	0.0	59 0.5	98 0.8	170 1.1	109 0.9	56 0.7	0 0.0	0 0.0	0	492
	rw	V.V	0.0	0.0	V.0	۷.5	V.0	1.1	V.7	0.7	0.0	0.0	0.0	1.1
1	EQ5001 ELEC	0	CHIL O	LED WATE 0	R PUMP ( 0	6562 6562	(5/2	50//	(0(0	<b>5</b> 077	۸	^	۸	71.047
	PK	0.0	0.0	0.0	0.0	29.8	6562 29.8	5965 29.8	6860 29.8	5966 29.8	0 0.0	0.0	0 0.0	31,916 29.8
	F0E010		CUMU	VENIGED HI	\TED 01124	n								
	EQ5010 ELEC	0	0	ENSER WA	TIER PUMI 0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5300		CONT	ROL PANE	EL & INT	ERLOCK								

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# EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2 - REPLACE FLUORESCENT BALLASTS

1 EQ5020

HEAT WATER CIRC. PUMP C.V.

***														
	PK PK	0.0	0.0	0.0	0.0	220 1.0	220 1.0	200 1.0	230 1.0	200 1.0	0.0	0.0	0.0	1,070
2	EQ1000		PRF	VENTS CO	OLING EN	FRGY								
-	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
. 2	EQ5001		CHI	LLED WAT	ER PUMP (	C.V.								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 .	EQ5010 ELEC	۸			ATER PUMP						_			
	PK PK	0.0	0 0.0	0.0	0.0	- 0 0.0	0.0	0 0.0	0 0.0	0	0	0	0	. 0
		۷.۷	0.0	v.v	· V.V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ4003				FAN C.V.									
	ELEC	9754	8825	10683	9290	10219	10219	9290	10583	9290	10219	9290	9290	117,051
	PK	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4
1	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	2276	2059	2493	2168	2384	2384	2168	2493	2168	2384	2168	2168	27,312
	PK	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
2	EQ4003				FAN C.V.									
	ELEC PK	0	0	0	0	0	0	0	0	0	0	0	0	0
	PN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003		FC -	CENTRIF.	FAN C.V.									
	ELEC	13975	12644	15305	13309	14640	14640	13309	15305	13309	14640	13309	13309	167,695
	PK	66.5	66.5	6ć.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5
. 1"	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	1747	1580	1913	1664	1830	1830	1664	1913	1664	1830	1664	1664	20,962
	PK	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
5	EQ4003				FAN C.V.									
	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	19076	240,355
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
5	EQ4003		FC (	CENTRIF.	FAN C.V.									
	ELEC	2504	2265	2742	2384	<b>2</b> 623	2623	2384	2742	2384	2623	2384	2384	30,044
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
6	EQ4003		FC (	CENTRIF.	FAN C.V.									* 4
	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	19076	240,355
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
6	EQ4003		FC (	CENTRIF.	FAN C.V.									
	ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	30,044
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
1	EQ2101		PUR	CHASED D.	ISTRICT S	TEAM								
	P STEAM	2186	2067	1626	441	0	0	0	0	0	297	881	1849	9,347
	PK	11.8	11.8	11.8	8.3	0.0	0.0	0.0	0.0	0.0	8.1	10.8	11.8	11.8

	ne Air Condi Trane Custo	_		: Network										V 600 PAGE 37
44	IPMENT ENERG LACE FLUORES			TERNATIV	E 2									
	ELEC PK	6264 29.8	5667 29.8	5727 29.8	2267 29.8	0.0	0.0	0.0	0.0	0.0	2416 29.8	4057 29.8	5966 <b>29.</b> 8	32,363 29.8
1	EQ5061		COND	ENSATE F	ETURN PU	MP			٠					
_	ELEC	117	106	107	42	0	0	0	0	0	45	76	112	606
	PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
2	EQ2101		PURC	HASED DI	STRICT S	TEAM								
	P STEAM	10568	9993	7861	2236	0	0	0	0	0	1438	4317	8941	45,354
	PK	57.2	57.2	57.1	40.2	0.0	0.0	0.0	0.0	0.0	39.3	52.1	57.2	57.2
2	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	5220	4723	5245	2883	- 0	0	0	0	0	2983	4176	4971	30,201
	PK	24.9	24.9	24.9	24.9	0.0	0.0	0.0	0.0	0.0	24.9	24.9	24.9	24.9
2	EQ5061		COND	ENSATE F	ETURN PU	MP								
	ELEC	26	23	26	14	0	0	0	0	0	15	21	25	150
	PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
3	EQ2000		PREV	ENT SUM	OF HEAT	ENERGY								*
٠.	GAS	0	0	0	0	0	0	0	0	0	0	0	- 0	0

PK

3 EQ5020 ELEC

PK

0.0

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HEAT WATER CIRC. PUMP C.V.

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# UTILITY PEAK CHECKSUMS - ALTERNATIVE 2 REPLACE FLUORESCENT BALLASTS

	U	Ţ	I	. I	T	Y	Р	Ε	A	K	С	Н	Ε	С	K	S	IJ	M	S	
•	•		-		,	,		_	• •	••	•	• • •		•		•	•		v	

Utility ELECTRIC DEMAN	Utili	.tv	ELECTRIC	DEMAND
------------------------	-------	-----	----------	--------

Peak Value 954.5 (kW) Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

Eqp. Ref. Num.	Equipment Code Name			Equipment	Description	Utility Demand (kW)	
Cooling	Equipment				-		
1	EQ1001S	2-STG CTV <	555 T	ONS		288.1	30.19
Sub Tota	ıl					283.1	30.19
Sub Tota	:1					0.0	0.00
Air Movi	ng Equipment						
1 3 5 6		SUMMATION OF SUMMATION OF SUMMATION OF SUMMATION OF	FAN FAN	ELECTRICAL ELECTRICAL	DEMAND DEMAND	57.3 74.9 107.3 107.3	11.24
Sub Tota	ıl					346.8	36.33
Sub Tota						0.0	0.00
Lights Base Ut Misc Eq Sub Tota Grand To	uipment l					319.6 0.0 0.0 319.6	0.00

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**
 TRACE 600
    ANALYSIS
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 122

Weather File Code:

CARLISLE

Location:

ENERGY SAVINGS OPPORTUNITY STUDY

Latitude:

40.2 (deg)

Longitude:

77.2 (deg)

Time Zone:

5

Elevation:

475 (ft)

Barometric Pressure:

29.2 (in. Hg)

Summer Clearness Number:

1.00

Winter Clearness Number:

1.00

Summer Design Dry Bulb:

92 (F)

Summer Design Wet Bulb:

72 (F)

Winter Design Dry Bulb:

4 (F)

Summer Ground Relectance:

Winter Ground Relectance:

0.20 0.20

Air Density:

0.0742 (Lbm/cuft)

Air Specific Heat:

0.2444 (Btu/lbm/F)

Density-Specific Heat Prod:

1.0882 (Btu-min./hr/cuft/F)

Latent Heat Factor:

4,790.2 (8tu-min./hr/cuft)

Enthalpy Factor:

4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May

To September

System Simulation Period: January To December

Cooling Load Methodology:

CLTD/CLF (Transfer Function Method)

Time/Date Program was Run:

12:31: 9 2/2/94

Dataset Name:

CB122B .TM

AIRFLOW - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

(Design Airflow Quantities)

andraetus Bironete			Main			Auxil.	Room
System System Number Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
',	(01111)	(0:111)	(01111)	(01111)	(01111)	(01111)	(01111)
1 TRH	10,853	36,175	36,175	36,175	10,853	0	0
2 SZ	0	17,730	17,730	17,730	0	0	17,730
3 INDFP	5,830	19,435	19,435	36,448	19,435	32,434	0
	0	0	1,835	0	0	0	0
5 DD	8,357	27,856	27,856	28,824	27,856	0	0
6 DD	8,357	27,856	27,856	28,824	9,325	0	0
Totals	33,397	129,052	130,887	148,000	67,468	32,434	17,730

CAPACITY - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

			Coo	ling					- Heating			
System Number	System Type	Capacity	-	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)		Reheat Capacity (Btuh)	Humidif. Capacity (8tuh)		Heating Totals (Btuh)
1	TRH	64.2	0.0	0.0	64.2	-68,182	0	-630,301	0	0	0	-698,484
. 2	SZ	2.3	0.0	0.0	2.3	-9,837	0	-117,003	0	0	0	-9,837
3	INDFP	46.4	88.4	0.0	134.8	-680,963	-1,230,942	0	0	0	0	-1,911,905
. 4	UH	0.0	0.0	0.0	0.0	-6,715	0	0	0	0	0	-6,715
5	DD	54.6	0.0	0.0	54.6	-245,454	0	-435,189	0	0	0	-680.644
6	DD	54.6	0.0	0.0	54.6	-245,454	0	-435,189	0	.0	0	-680,644
Totals		222.0	88.4	0.0	310.4	-1,256,606	-1,230,942	-1,617,683	0	0	0	-3,988,228

The building peaked at hour 14 month 7 with a capacity of 222.0 tons

ENGINEERING CHECKS - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

ENGINEERING CHECKS------

			Percent	·	Coo	ling		Heat	ing	
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	Btuh/	Floor Area
Number	Auxiliary	Туре	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	TRH	30.00	0.63	563.3	896.2	13.39	0.63	~12.14	57,549
2	Main	SZ	0.00	4.32	7,846.6	1,814.5	6.61	4.32	-2.40	4,100
3	Main	INDFP	30.00	0.47	418.7	891.2	13.46	0.47	-16.46	41,364
3	Auxiliary	INDFP	0.00	0.78	367.0	468.0	25.64	0.78	-29.76	41,364
. 4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
. 5	Main	DD	30.00	1.03	510.6	497.1	24.14	1.03	-25.10	27,121
6	Main	DD	30.00	1.03	_ 510.6	497.1	24.14	1.03	-25.10	27,121

System 1 Peak TRH - TERMINAL REHEAT

******	*******	****** C	OOLING COIL	PEAK ****	******	*******	******	CLG SPA	CE PEAK ****	****** HEAT	ING COIL PEA	********
Peaked a	at Time ==	:>	Mo/Hr:	7/14			*	Mo/Hr:			Mo/Hr: 13/	
Outside	Air ==>	0A	DB/WB/HR:	91/ 74/105.	0		*	OADB:	•	:	OADB: 4	_
							*		*	;		
*		Space	Ret. Air	Ret. Air	Net	Percnt	*	Space	Percnt *	Space Pea	k Coil Peal	Percnt
	S	Sens.+Lat.	Sensible			Of Tot		Sensible	Of Tot *			
Envelopa	Loads	(Btuh)	(Btuh)		(Btuh)	(%)		(Btuh)	(%) *			
Skylit	e Solr	0	Ò	, ,	Ó	0.00		0	0.00 *			0.00
Skylit	e Cond	0	0		0	0.00		0	0.00 *		-	0.00
Roof C		0	0		0	0.00		0	0.00 *		) (	0.00
Glass		0	0		0	0.00		0	0.00 *		) (	0.00
Glass		0	0		0	0.00		0	0.00 *		) (	0.00
Wall C		0	0		0	0.00		0	0.00 *			0.00
Partit		18,940	•		18,940	2.46		18,940	5.85 *			
Contract to the contract of th	d Floor	0			0	0.00		0	0.00 *	,	) (	
	ration	0			0	0.00		0	0.00 *			
	tal==>	18,940	0		18,940			18,940			•	
Internal		10,770	v		10,740	4.40	, ;	10,747	5.85 * *	•	2 -68,182	2 100.00
Lights		257,578	0		257,578	33.43		273,881			` '	
People		63,941	V		63,941	8.30		31,097	9,60 *			0.00
Misc	•	03,741	0	0	03,741			31,077				0.00
	tal==>		0	-	321,519	41.72						0.00
Ceiling		021,517	0		321,317	0.00		304,978	94.15 *		,	
Outside		0	0		· · · · · · · · · · · · · · · · · · ·			0	0.00 *			0.00
Sup. Fan		V	V	V	340,359			0	0.00 *			0.00
Ret. Fan			18.007		77,173				0.00 *			0.00
Duct Hea			10.007		18,007	2.34			0.00 *		(	
OV/UNDR		0	V		0	0.00		•	0.00 *		_	0.00
Exhaust	-	U	r (00	^	0	0.00		0	0.00 *			0.00
			-5,402		-5,402				0.00 *			0.00
Terminal	by pass		0	0	0	0.00			0.00 *		(	0.00
Crand To	+-1>	340,459	10 /05	۸	770 007	100 00	*	707 017	*			, , , , , , , , , , , , , , , , , , , ,
dianu iu	Ud1/	340,437	12,605	0	170,597	100.00	*	323,917	100.00 *	-68,182	-68,182	2 100.00
, <u>12-1-</u>			coo								AREAS	
	_		Sens Cap.			ig D8/W8/!	łR	Leaving	D8/W8/HR	Gross Total	t Glass (	(sf) (%)
10	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg	F Grai	ns Deg	F Deg	F Grains	Floor 57	7,549	
Main Clg	64.2	770.6	578.3	36,175		3.7 90		.8 62.		Part 16	5,570	
Aux Clg	0.0	0.0	0.0	0		0.0		.0 0.		Exflr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	.0 0	.0 0.	0.0	Roof	0	0 0
Totals	64.2	770.6								Wall	0	0 0
			ECTION		AIR	RFLOWS (c)	Fm)		-ENGINEERING	CHECKS	TEMPERATUR	RES (F)
		y Coil Ai		Lvg	Type	Cooling	Heati		lg % OA	30.0	Type Cl	
	(Mbh)			Deg F		10,853		0 0	lg Cfm/Sqft	0.63		5.8 69.7
Main Htg	-68.		175 68.0	69.7	Infil	0			lg Cfm/Ton	563.33		6.0 68.0
Aux Htg	0.		0.0	0.0	Supply	36,175	36,	175 0	lg Sqft/Ton	896.17		5.5 68.0
Preheat	-630.	3 36,1	48.8	64.8	Mincfm	36,175	•		lg Btuh/Sqft			0.0 68.0
Reheat	-0.	0	0.0	0.0	Return	36,175	36,		lo. People	137		6.0 68.0
Humidif	0.	0	0.0	0.0	Exhaust	10,853	,		ltg % OA			).5 0.5
Opt Vent	0.	0	0.0	0.0	Rm Exh	. 0			Itg Cfm/SqFt			0.4
Total	-698.	5			Auxil	0			ltg Btuh/SqFt		_	.1 1.1
									, ,			<b>-</b>

Trane Air Conditioning Economics

By: Trane Customer Direct Service Network

System 2 Peak SZ - SINGLE ZONE

\* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1 Peaked at Time ==> Mo/Hr: 7/16 OADB/WB/HR: 91/ 73/ 98.0 OAD8: 91 OADB: 4 Outside Air ==> \* Net Percht \* Space Percht \* Space Peak Coil Peak Percht Space Ret. Air Ret. Air Total Of Tot \* Of Tot \* Space Sens Tot Sens Of Tot Sens.+Lat. Sensible Latent Sensible (%) \* (8tuh) (%) \* (Btuh) (Btuh) Envelope Loads (Btuh) (Btuh) (Btuh) (%) (Btuh) 0 Ó 0.00 0 0 0 0.00 0 0.00 0.00 \* 0.00 \* Skylite Solr 0 0 0.00 \* Skylite Cond 0 C 0 0.00 \* 0 0 -3,224 44.57 0 0 0 0 0 0 0 6 0 860 860 3.17 \* 0 0.00 \* 0 0.00 595 2.47 \* 0 0 0.00 239 0.99 \* -1,139 -1,139 15.75 747 3.10 \* -2,286 -2,870 39.68 0 0.00 \* 0 0.00 0 0.00 Roof Cond 0 595 2.19 \* 239 0.88 \* 595 Glass Solar 239 0 747 183 239 Glass Cond 929 3.43 \* Wall Cond Partition 0 0.00 \* 0 0 0 0 1,581 1,042 Exposed Floor 0 0.00 \* 0.00 \* 0 0 0 0 0.00 \* 0 0.00 ,581 6.56 \* -3,426 -7,234 100.00 0 0.00 \* Infiltration 2,623 9.67 \* 1,581 Sub Total==> Internal Loads 19,780 72.95 \* 19,780 4,712 17.38 \* 2,223 0 0.00 \* 0 0 0 0 0 0 -1,918 19,780 72.95 \* 82.11 \* 0 Lights 19,780 0 0.00 2,223 9.23 \* 0 0 0.00 People 4,712 0 0.00 \* 24,492 90.33 \* 22,002 ^ 0.00 \* 506 Misc 0.00 \* 0 0 0.00 0 0 -243 91.34 \* 0.00 2.10 \* 0 0.00 0 0 0.00 \* 0 0.00 \* 0 0.00 0 0.00 \* 0.00 \* 0 0.00 Sup. Fan Heat 0 0.00 \* 0.00 \* 0 0.00 Ret. Fan Heat 0.00 \* 0 0 0.00 \* 0 0.00 Duct Heat Pkup 0 -0.00 0 0.00 \* 0.00 \* OV/UNDR Sizing 0 0 0.00 \* 0.00 \* 0 0.00 Exhaust Heat 0 0.00 \* Terminal Bypass 0 0 0 0.00 Grand Total==> 27,991 -876 0 27,115 100.00 \* 24,089 100.00 \* -3,668 -7,234 100.00 Total Capacity Sans Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%) (Tons) (Mbh) (Mbh) (cfm) Deg F Deg F Grains Deg F Deg F Grains Floor 4,100 27.1 24.6 17,730 76.6 69.9 102.0 73.8 69.4 104.3 Part 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 ExFlr Main Clg 2.3 Part 0 Aux Clg 0.0 0 0.0 0 0.0 0.0 0.0 0.0 0.0 0.0 Roof Opt Vent 0.0 0.0 580 0 0 196 2.3 27.1 Wall 21 11 Totals Type Cooling Heating Clg % OA 0.0 Type Clg Htg Capacity Coil Airfl Ent Lvg (Mbh) (cfm) Deg F Deg F Vent 0 0 Clg Cfm/Saft 4.32 SADB 73.8 68.2 Infil 0 5
Supply 17,730 17,730
Mincfm 0 0
Return 0 17,730 Main Htg Clg Cfm/Ton 7846.61 -9.8 17,730 67.7 68.2 Plenum 76.5 67.7 Clg Sqft/Ton 1814.50 0.0 79.7 67.7 0.0 Return Aux Htg 0 0.0 -117.0 17,730 67.7 73.8 Clg Btuh/Sqft 6.61 Ret/OA 76.6 67.7 Preheat Mincfm No. People 10 Reheat 0.0 0.0 0.0 Return Runarnd 75.0 68.0 0 0 0.0 0.0 Exhaust 0.0 O Ktg % OA 0.0 Fn MtrTD 0.0 0.C Humidif 0 0.0 0.0 Rm Exh 17,730 0 Htg Cfm/SqFt 4.32 Fn BldTD 0.0 Auxil 0 0 Htg Btuh/SqFt -2.40 Fn Frict 0.0 0.0 Opt Vent 0.0 -9.8 0.0 Total

System 3 Block INDFP - 4-PIPE INDUCTION

<b>*</b> ****** Peaked a			OOLING COIL Mo/Hr:		********			SPACE Hr: 7			TING COIL Mo/Hr: 1		******
Outside	Air ==>	OA	D8/WB/HR: '	91/ 74/105.0	)	;	‡ OA		15 *		OADB:	•	
		Space	Ret. Air	Ret. Air	Net	Percnt	f So	ace	* * Percnt		eak Coil	Peak	Percnt
	:	Sens.+Lat.	Sensible			Of Tot			Of Tot *				Of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)			(%) *	•			(%)
Skylit	e Solr	0	0		0		•	Ó	0.00 *		Ó	Ó	0.00
Skylit	e Cond	0	0		0	0.00	ŧ	0	0.00 *		0	0	0.00
Roof C	ond	474	21,484		21,957	1.29	t .	664	0.10 *	-1,5	79 -73	,446	3.84
Glass	Solar	171,927	0		171,927	10.09		822	28.71 *			0	0.00
Glass	Cond	53,830	0		53,830	3.16			6.19 *	-276,2	87 -276	,287	14.45
Wall C	ond	113,330	16,902		130,232	7.64	168,	977	26.10 *			,319	19.74
Partit	ion	0			- 0	0.00			0.00 *	-		0	0.00
Expose	d Floor	0			0	0.00	ķ	0	0.00 *		0	0	0.00
Infilt	ration	736,354			736,354	43.20	170,	578		-1,184,8	52 -1.184	.852	61.97
Sub To	tal::>	1,075,915	38,386		1,114,301			123			25 -1,911		100.00
Internal	Loads						, k		*		<b>,</b>	,	
Lights		179,324	0		179,324	10.52	51,	508	7.96 *		0	0	0.00
People		45,248			45,248				0.94 *		0	0	0.00
Misc		0	0	0	0	0.00		0	0.00 *		0	0	0.00
Sub To	tal==>	224,572	0	0	224,572	13.18	57.	577	8.89 *		0	0	0.00
Ceiling	Load	14,654	-14,654		0	0.00	23,	486	3.63 *	-47,8	11	0	0.00
Outside	Air	0	0	0	252,361	14.81	ķ .	0	0.00 *		0	0	0.00
Sup. Fan	Heat				110,564	5.49	t		0.00 *			0	0.00
Ret. Fan	Heat		13,820		13,320	0.81	t .		0.00 *			0	0.00
Duct Hea	t Pkup		0		0	0.00	t		0.00 *			0	0.00
OV/UNDR	Sizing	119			119	0.01	ŧ	119	0.02 *		0 -	0	0.00
Exhaust			-11,266	0	-11,266	-0.66	ŧ		0.00 *			0	0.00
Terminal	Bypass		0	0	0	0.00	(		0.00 *			0	0.00
						*	ł		*				
Grand To	tal::>	1,315,260	26,287	0	1,704,471	100.00 4	647,	306	100.00 *	-1.838,9	36 -1,911	,905 -	100.00
eriy Sining ya M										•	,	,	
			cool								AREAS-		
			Sens Cap.					ing D8	/WB/HR	Gross Tot	al Gla	ss (sf	f) (%)
	(Tons)	(Mbh)		(cfm)	-	g F Grains			Grains	Floor	41,364		
Main Clg	46.4	557.0	402.9	19,435		6.7 78.0	59.9	57.7	69.7	Part	0		
Aux Clg	88.4			32,434		3.9 73.7		53.0	42.1	ExFlr	0		
Opt Vent		0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Roof	14,680		0 0
Totals	134.8	1,617.6								Wall	28,354	5,1	.52 18
	HEATIN	IG COIL SELI	ECTION		AI	RFLOWS (cfm	1)	E	NGINEERING	CHECKS	TEMPER	ATURES	; (F)
•	Capacit	y Coil A	irfl Ent	Lvg		Cooling	Heating		% OA	30.0	Type	Clg	
	(Mbh)			Deg F	Vent	5,830	. 0	Clg	Cfm/Sqft	0.47	SADB	65.1	_
Main Htg	-681.		435 64.5	96.7	Vent Infil	17,013	17,013		Cfm/Ton	418.73	Plenum	76.1	
-	-1,230.	9 32,	434 68.0	102.9	Supply	19,435	19,435	Clg	Sqft/Ton	891.20	Return	76.8	
Preheat	-0.	0 19,	435 64.5	59.9	Mincfm	0	0	Clg	Btuh/Sqft	13.46	Ret/OA	80.9	
Reheat	0.	0	0.0	0.0	Return	19,435	19,435	No.	People	98	Runarnd	75.0	
Humidif	0.	. 0	0.0			5,830	0	Htg	% DA	0.0	Fn MtrID		
	Δ	Δ	0.0	0.0	Rm Exh	0	^		06 10.51	A 43			
Opt Vent	0.	· U	0.0	0.0	KIII CXII	U	0	нtд	Cfm/SqFt	0.4/	Fn BldTD	1.0	1.0

System 4 Block UH - UNIT HEATERS

					*******	*****	*****				***** HEAT			*****
* .	t Time ==>		Mo/Hr: (	•			*			/ 0 *		Mo/Hr: 13/	1	
• Outside	Air ==>	UA	D8/WB/HR:	0/ 0/ 0.	0		*	OA	DB:	0 *		OADB: 4		
		C	nat via	0442	11 - 1	•	¥			*				
	C-	Space		Ret. Air		Perc			ace	Percnt *	Space Peal			Percnt
ini Enuolone		ns. +Lat.	Sensible	Latent	Total			Sensi		Of Tot *	Space Sens			Of Tot
Envelope		(Btuh)	(Btuh)	(Btuh)	(Btuh)	•	k) *	(8t		(%) *	(Btuh	•	-	(%)
Skylite Skylite		0	0		0		00 *		0	0.00 *	(	•	0	0.00
Roof Co		0	0		0		00 *		0	0.00 *	,	)	0	0.00
Glass		0	0		0		00 *		0	0.00 *	(	•	0	0.00
Glass		0	0		0		00 *		0	0.00 *	(	•	0	0.00
Wall Co		0	0		0		00 *		0	0.00 *	(	•	0	0.00
Partit		0	V		0		00 *		0	0.00 *	( 711		0	0.00
A.1		0			- 0		00 *		0	0.00 *	-6,71		_	100.00
Infilt	d Floor	0			0		00 *		0	0.00 *	(		0	0.00
		0	^		0		)0 *		0	0.00 *	( · • · · •		0	0.00
Sub To		0	0		0	0.0	* 00		0	0.00 *	-6,71	-6,7	15	100.00
Internal	Loads	Δ.	٨		^	^ /			^	* * * * * * * * * * * * * * * * * * *			•	
Lights People		0	0		0		00 *		0	0.00 *	(		0	0.00
• Misc		0	٨	۸	0		00 *		0	0.00 *	(	•	0	0.00
Sub Tot	+ 01 )	0	0	0	0		00 *		0	0.00 *	(	•	0	0.00
		•	0	0	0		)0 *		0	0.00 *	(	•	0	0.00
Ceiling ( Outside (		0	0	. ^	0		00 *		0	0.00 *	(	•	0	0.00
		U	0	0	0		00 *		0	0.00 *	(	)	0	0.00
Sup. Fan Ret. Fan			٨		0		00 *			0.00 *			0	0.00
Duct Heat			0		0		00 *			0.00 *			0	0.00
		۸	0		0		00 *		۸	0.00 *			0	0.00
OV/UNDR S Exhaust H	_	0	۸	۸	0		00 *		0	0.00 *	(	)	0	0.00
Terminal		•	0	0	0		)() * )() *			0.00 *			0	0.00
. iciminat	by pass		V	U	U	0.0	)U ↑ *			0.00 *			0	0.00
. Grand Tot	taly	0	0	0	0	0 (	)0 *		0	0.00 *	-7.15	. , ,	1.5	100.00
urana rot	vai/	V	V	V	V	0.0	/V *		U	0.00 ↑	-6,719	-6,7	13	100.00
				ING COIL S	:							AREAS		
	Total C	anacity	Sens Cap.		Enteri:			Leav			Gross Total		(c f )	/«\
NV s	(Tons)	(Nbh)	(Mbh)	(cfm)	Deg F De	_		Deg F	•			. G1455 2,544	(51)	(4)
Main Clg	0.0	0.0	0.0	(СТШ)	-	0.0	0.0	0.0	0.0	0.0		1,632		
Aux Clg	0.0	0.0	0.0	0		0.0	0.0	0.0	0.0	0.0	Exflr	0		
Opt Vent	0.0	0.0	0.0	0		0.0	0.0	0.0	0.0	0.0	Roof	0		<b>o</b> c
Totals	0.0	0.0	V.V	v	V.V	•.•	0.0	0.0	V.V	0.0	Wall	0		0 0
	• • • • • • • • • • • • • • • • • • • •	***									W411	V		٠ ،
	HEATING	COIL SEL	ECTION		AI	RFLOWS	(cfm)		F	NGINEERING	CHECKS	TEMPERAT	IRES	(F)
		Coil A		Lvg		Cooli		Heating		% OA	0.0		Clg	Htg
	(Mbh)			Deg F	Vent			. 0		Cfm/Sqft	0.00	SADB	0.0	71.
Main Htg	-6.7	•		71.4	Infil		0	. 0	_	Cfm/Ton		Plenum	0.0	68.(
Aux Htg	0.0		0 0.0	0.0	Supply			1,835		Sqft/Ton	0.00	Return	0.0	68.(
Preheat	0.0		0 0.0	0.0	Mincfm		0	0		Btuh/Sqft		Ret/OA	0.0	68.(
Reheat	0.0		0 0.0	0.0	Return		0	1,835	•	People	0	Runarnd	0.0	68.
Humidif	0.0		0 0.0	0.0	Exhaust		0	0		% OA	0.0	Fn MtrTD	0.0	0.(
Opt Vent	0.0		0 0.0	0.0	Rm Exh		0	0	_	Cfm/SqFt		Fn BldTD	0.0	0.0
Total	-6.7		•••		Auxil		0	0	_	Btuh/SqFt		Fn Frict	0.1	0.
								•	3		=		- • •	••

System 5 Block DD - DOUBLE DUCT

	******** t Time ==		OOLING COIL Mo/Hr:		********			SPACE /Hr: 7		***** HEA	TING COIL P Mo/Hr: 13		*****
			DB/WB/HR:		0			4DB: 9	•			/ 1 4	
		Cnoon	Dat Air	0-1 6:		:	*		*				a Sau
	9	Space ens.+Lat.	Sensible	Ret. Air Latent		Percnt :		DACE	Percnt *				Percnt
Envelope		(Btuh)	(Btuh)		(Btuh)	(%)		tuh)	Of Tot *	•			Of Tot
Skylit		0	(6,011)	, ,	(66411)	0.00		0	(%) * 0.00 *		1) (BL	uh)	(%)
	e Cond	0	0		0	0.00		0	0.00 *		0	0	0.00 0.00
Roof C		14,486	0		14,486			,221	7.66 *		-	0 204	21.28
Glass		17,909	0		17,909			,285	7.69 *	•	36 <b>-48,</b> 0	0	0.00
Glass		4,840	0		4,840	0.74		, 203	2.44 *		-	-	10.88
- Wall C		4,161	526		4,687	0.74		•	2.65 *	,			8.34
Partit		0	320		- 0	0.00		0	0.00 *		•	0	0.00
	d Floor	0			0	0.00		0	0.00 *		0	0	0.00
-	ration	29,570			29,570			,324			)3 -67,	-	29.70
	tal==>	70,966	526		71,492			,619	28.14 *	•			70.19
Internal		, , , , , ,	320		71,471	10.75		,017	*	•	137,	200	70.17
Lights		123,012	0		123,012	18.79	t 129	,725	61.24 *		0	0	0.00
People		30,203	•		30,203	4.61		,612	6.90 *		0	Ô	0.00
Misc		0	0	0	0	0.00		0	0.00 *		0	0	0.00
Sub To	tal==>	153,215	0		153,215	23.40		, 337	68.14 *		0	0	0.00
Ceiling		1,375	-1,375	•	0	0.00			0.73 *		•	0	0.00
Outside		0	0	0	255,335			0	0.00 *	,	0	0	0.00
Sup. Fan				•	158,470			•	0.00 *		•	0	0.00
Ret. Fan			19,809		19,809	3.03			0.00 *			0	0.00
Duct Hea			0		0				0.00 *			0	0.00
OV/UNDR		6,326			6,326			326	2.99 *		18 -67,	648	29.81
Exhaust			-9,934	0	-		,		0.00 *	,	.,	0	0.00
Terminal	Bypass		. 0		. , 0	-0.00			0.00 *			0	0.00
٠.						;	ŧ		*			•	****
Grand To	tal==>	231,882	9,026	0	654,712	100.00	211,	835	100.00 *	-229,33	31 -226,	948	100.00
			000	THE COTE OF	:  FCTTON						ADCAC		
			Sens Cap.									s (sf)	
	(Tons)	(Mbh)	(Mbh)	(cfm)	and the second second			-	Grains		27,121	2 (21)	(*)
Main Clg	54.6	654.7	510.6	27,856	80.4 69		•	62.1	84.9	Part	0		
Aux Clg	0.0	0.0	0.0	0		0.0		0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0		.0 0.0		0.0	0.0	Roof	8,563		0 0
Totals		654.7									1,613		0 29
	UCATTNO	רמזו פרו	ECTION		^ T O	CL090 / . 4.	. )	-	NOTHECOTNO	OUEOKO	TOUGEAL		/-X
		y Coil A				rcows (Cill Cooling	Heating		NGINEERING % OA		TEMPERA		
	(Mbh)			•	Vent	-	. 0		Cfm/Sqft		Type	Clg	Htg
Main Htg	-245.9					968	968		Cfm/Ton		SADB Plenum	68.0	<b>75</b> .6
Aux Htg	0.0			0.0	Supply	27,856	27,856	-	Sqft/Ion		Return	75.4	66.5
Preheat	-435.2					0.030	27,000	_	Btuh/Sqft		Ret/OA	76.1	67.5
Reheat	0.0		0.0		Return	27,856			People	65	Runarnd	80.4	67.5
Humidif	0.0		0 0.0			8,357	27,030		% OA	0.0	Fn MtrTD	75.0 1.3	68.0 1.3
Opt Vent	0.0		0 0.0		Rm Exh	0,337	0	Hta	Cfm/SqFt	1 07	Fn 81dTD	1.0	1.0
Total	-680.6		. 0.0		Auxil	0	0		Btuh/SqFt		Fn Frict	2.9	2.5
***						-	·					<b>L.</b> /	4.,

System 6 Block DD - DOUBLE DUCT

													State of the state
					********	******	***** CF	G SPACE	PEAK ****	****** HEAT	ING COIL	PEAK *	******
Peaked at			Mo/Hr:				* M	o/Hr:	7/16 *		Mo/Hr: 1	3/1	
	ir ==>	DA	D8/W8/HR:	91/ 74/105.	0		*	DADB:	91 *		OAD8:	4 .	
							*		*			17 27	
and the second of the second o		Space		Ret. Air	Net	t Peront	*	Space	Percnt *	Space Pea	ak Coil	Peak	Percnt
		Sens.+Lat.	Sensible		Total	l Of Tot		sible	Of Tot *	•	ns Tot	Sens	Of Tot
		(Btuh)	(Btuh)	(Btuh)	(Btuh)		-	Btuh)	(%) *			tuh)	(%)
Skylite		0	0		(			0	0.00 *		0	0	0.00
Skylite			0			0.00		C	0.00 *		0	0	0.00
Roof Co		14,486	0		14,486			5,221	7.66 *	-48,28	36 -48	,286	21.28
Glass S		17,909	0		17,909			5,285	7.69 *		0	0	0.00
Glass C		4,840	0		4,840			5,167	2.44 *	-24,69	90 -24	,690	10.88
Wall Co		4,161	526		4,687			5,622	2.65 *	•	77 -18		8.34
Partiti		0			- (		*	0	0.00 *		0	0	0.00
Exposed		0				0.00	*	0	0.00 *		0	0	0.00
Infiltr		29,570			29,570	4.52		5,324	7.71 *	-67,40	)3 -67	,403	29.70
Sub Tot		70,966	526		71,492	2 10.92	<b>*</b> 5'	9,619	28.14 *	-157,05	56 -159	,300	70.19
Internal							*		*				
Lights		123,012	0		123,012			9,725	61.24 *		0	0	0.00
People		30,203			30,203			4,612	6.90 *		0	0	0.00
Misc		0	0	0	(			0	0.00 *		0	0	0.00
		,			153,219			1,337	68.14 *		0	0	0.00
		1,375	-1,375		(			1,553	0.73 *	.,	27	0	0.00
Outside A		0	0	0	255,335			0	0.00 *		0	0	0.00
Sup. Fan					158,470				0.00 *			0	0.00
Ret. Fan			19,809		19,809				0.00 *			0	0.00
Duct Heat		/ 70/	0		( 70.				0.00 *			0	0.00
OV/UNDR S		6,326	0.074			0.97		5,326	2.99 *		18 -67	,648	29.81
Exhaust H		4	-9,934		-9,934				0.00 *			0	0.00
Terminal	Bypass		0	0	C	0.00			0.00 *			0	0.00
Chand Tat	-11	071 000	0.00/	^	/51 710	100.00	*	0.75	100.00 #	222 7			
Grand Tot	d1>	231,882	9,026	V	654,/12	2 100.00	* 211	1,835	100.00 +	-229,33	-226	,948	100.00
				LING COIL S	:   E						<b>ADEA</b> 0		
ight in										Gross Tota	THREAD.	(	\
	(Tons)			(cfm)		eg F Grain			Grains			35 (51	) (%)
Main Clg	. ,	, ,		27,856						Floor 2 Part	27,121		
Aux Clg	0.0		0.0	27,030		0.0		0.0		Exflr	0		
Opt Vent	0.0		0.0	. 0			.0 0.0	0.0			8,563		0 0
Totals	54.6		• • • • • • • • • • • • • • • • • • • •	•	0.0	0.0		0.0	0.0		1,613	Á	60 29
											1,010	7	
	HEATIN	NG COIL SELE	CTION		AT	RELOWS (c)	fm)		ENGINEERING	CHECKS	TEMPER	THRES	(5)
		ty Coil A			Type	Cooling	Heating		g % OA	30.0	Туре	Clg	Htg
i.	(Mbh)			Deg F	Vent	8,357	. (			1.03	SAD8	68.0	
Main Htg	-245.		-	75.6	Infil	968	968		g Cfm/Ion		Plenum	75.4	l I
Aux Htg	0.		0 0.0	0.0	Supply	27,856	27,856		g Sqft/Ton		Return	76.1	l I
Preheat	-435.			62.8	Minofm	0	(		g Btuh/Sqft		Ret/OA	80.4	l I
Reheat	0.		0 0.0	0.0	Return	27,856	27,856		. People	65	Runarnd	75.0	l I
Humidif	0.		0 0.0	0.0	Exhaust	8,357	(		g % OA		Fn MtrTD	1.3	l I
Opt Vent	0.	. 0	0.0	0.0	Rm Exh	. 0	(		g Cfm/SqFt		Fn BldTD	1.0	
Total	-680.	. 6			Auxil	0	(		g Btuh/SqFt		Fn Frict	2.9	

BUILDING U-VALUES - ALTERNATIVE 3 Replace fluorescent fixtures

----- BUILDING U-VALUES------

											Room	Room
1.5						/hr/sqf	t/F)				Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	1 Tatal/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	<pre>1 Total/Ave.</pre>	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
Zona	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	<pre>11 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
Ione	<pre>3 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
12	STAIRS W ROOF	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
Zone	<pre>12 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
System	<pre>3 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	74.1	15.63
13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	<pre>13 Total/Ave.</pre>	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	<pre>8 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	<pre>10 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	<pre>14 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810		0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810		0.257	0.000	27.0	5.41
Zone	<pre>15 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	<pre>16 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
Buildin	g	0.229	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	52.6	10.93

BUILDING AREAS - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

-----BUILDING AREAS------

													· ·
				Floor	Total		Exposed						·
		Nimbi	ar ∩f	Area/Dupl		Partition	Floor	Skylight	541	Net Roof	Window	Win	Net Wall
Room		Dupl		Room	Area	Area	Area	Area		Area	Area	/W1	Area
Number		Flr		(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)		(sqft)
Hember	500011p01011		11111	(54/0)	(34/0)	(5410)	(3417)	(5910)	(*)	(3410)	(3410)	(")	(34,0)
1	SUB BSMT, BSMT W	1	1	45,125	45,125	13,222	0	0	0	0	0	0	0
Zone	i i			•	45,125	13,222	0	0	0	0	0	0	0
4	BSMT E	1	1	12,424	12,424	3,348	0	0	0	0	0	0	0
Zone	4 Total/Ave.			•	12,424	3,348	0	0	0	0	0	0	0
System	1 Total/Ave.				57,549	16,570	0	0	0	0	0	0	. 0
2	TOILETS, KITCHEN	1	1	3,520	3,520	. 0	0	0	0	0	21	11	174
	2 Total/Ave.			•	3,520	0	0	0	0	0	21	11	174
11	TOILETS W ROOF	1	1	580	580	0	0	0	0	580	0	0	0
Zone	<pre>11 Total/Ave.</pre>	•			580	0	0	0	0	580	0	0	0
System	2 Total/Ave.				4,100	0	0	0	0	580	21	11	174
3	STAIRS	1	1	560	560	0	0	0	0	0	255	29	625
Zone	3 Total/Ave.				560	0	0	0	0	0	255	29	625
5	1ST FL OFFICES	1	1	11,724	11,724	0	0	0	0	0	1,573	19	6,530
Zone	5 Total/Ave.				11,724	0	0	0	0	0	1,573	19	6,530
7	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	0	0	1,610	17	7,730
Zone	7 Total/Ave.			•	14,400	0	0	0	0	0	1,610	17	7,730
9	3RD FL OFFICES	1	1	14,400	14,400	0	0	0	0	14,400	1,610	17	8,010
Zone				•	14,400	0	0	0	0	14,400	1,610	17	8,010
. 12	STAIRS W ROOF	i	1	280	280	0	0	0	0	280	105	25	307
Zone	12 Total/Ave.				280	0	0	0	0	280	105	25	307
System	3 Total/Ave.				41,364	0	0	0	0	14,680	5,152	18	23,202
13	SUPPLY STORAGE	1	1	2,544	2,544	1,632	0	0	0	0	. 0	0	0
Zone	<pre>13 Total/Ave.</pre>				2,544	1,632	0	0	0	0	0	0	0
System	4 Total/Ave.				2,544	1,632	0	0	0	0	0	0	0
6	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	6 Total/Ave.				9,884	0	0	0	0	0	250	19	1,038
8	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	55
Zone	<pre>8 Total/Ave.</pre>				8,674	0	0	0	0	0	105	66	55
10	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	10 Total/Ave.				8,563	0	0	0	0	8,563	105	64	60
System	5 Total/Ave.				27,121	0	. 0	0	0	8,563	460	29	1,153
14	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	<pre>14 Total/Ave.</pre>				9,884	0	0	0	0	0	250	19	1,038
15	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	55
Zone	<pre>15 Total/Ave.</pre>				8,674	0	0	0	0	0	105	66	55
16	· · · · · · · · · · · · · · · · · · ·	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	<pre>16 Total/Ave.</pre>			•	8,563	. 0	0	0	0	8,563	105	64	60
System	6 Total/Ave.				27,121	0	0	0	0	8,563	460	29	1,153
Buildin	g				159,799	18,202	0	0	0	32,386	6,095	19	25,681
													I

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ASHRAE 90 ANALYSIS - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

----- A S H R A E 90 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F) Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F) Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 24.46 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3 REPLACE FLUORESCENT FIXTURES

## System Totals

Percent		ing Loa			ng Load		Cooling	Airflow		Heating	Airflow	
Design Load	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	15.5	0	0	-205,262	15	202	6,544.3	0	0	0.0	0	0
5 - 10	31.0	9	100	-410,523	7	93	13,088.7	0	0	0.0	0	0
10 - 15	46.6	7	72	-615,785	- 4	57	19,633.1	0	0	0.0	0	0
15 - 20	62.1	13	135	-821,046	5	68	26,177.4	0	0	0.0	0	0
20 - 25	77.6	6	65	-1,026,308	1	17	32,721.7	0	0	0.0	0	0
25 - 30	93.1	11	113	-1,231,569	8	104	39,266.1	0	0	0.0	0	0
30 - 35	108.6	18	189	-1,436,831	8	109	45,810.5	0	0	0.0	0	0
35 - 40	124.2	4	38	-1,642,093	14	194	52,354.8	0	0	0.0	0	0
40 - 45	139.7	4	45	-1,847,354	37	497	58,899.2	0	0	0.0	0	0
45 - 50	155.2	6	63	-2,052,616	0	0	65,443.5	0	0	0.0	0	0
50 - 55	170.7	5	50	-2,257,878	0	0	71,987.9	0	0	0.0	0	0
55 - 60	186.2	1	15	-2,463,139	0	0	78,532.2	0	0	0.0	0	0
60 - 65	201.8	7	80	-2,668,401	0	0	85,076.6	0	0	0.0	0	0
65 - 70	217.3	6	60	-2,873,662	0	0	91,620.9	0	0	0.0	0	0
70 - 75	232.8	3	35	-3,078,924	0	0	98,165.3	0	0	0.0	0	0
75 - 80	248.3	1	10	-3,284,186	0	0	104,709.6	0	0	0.0	0	0
80 - 85	263.8	0	0	-3,489,447	0	0	111,254.0	0	0	0.0	0	0
<b>85 -</b> 90	279.4	0	0	-3,694,709	0	0	117,798.3	100	2,520	0.0	0	0
90 - 95	294.9	0	0	-3,899,971	0	0	124,342.7	0	0	0.0	0	0
95 - 100	310.4	0	0	-4,105,232	0	0	130,887.0	0	0	0.0	0	0
Hours Off	0.0	0	7,690	0	0	7,419	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

Temperature ----- Zone Number --Range 5 7 9 12 11 3 13 6 8 10 (F) Max. Temp. 78.3 78.0 159.7 108.9 86.3 84.8 84.4 83.2 85.3 90.1 84.7 84.8 84.2 84.7 84.8 84.2 Mo./Hr. 7 6 7 5 9 18 8 16 7 20 7 21 7 24 7 21 7 20 8 16 7 2 10 24 7 6 7 2 10 23 7 6 Day Type 2 4 1 4 5 ..... Number of Hours Above 100 0 6,905 2,636 0 - 0 0 0 0 95 - 100 0 0 423 169 0 0 0 0 0 0 0 0 90 - 95 277 1,266 0 0 0 76 0 0 85 - 90 0 0 374 156 103 0 0 0 36 1,831 0 0 0 0 80 - 85 0 0 241 1,183 1,129 1,108 1,059 608 1,137 1,473 1,332 1,780 905 1,332 1,790 905 75 - 80 3,672 1,623 411 278 1,753 1,853 1,870 2,227 1,831 1,250 2,882 4,414 3,281 2,934 4,408 3,281 2,103 4,132 129 784 677 711 743 854 668 616 1,085 2,286 1,391 1,033 2,282 1,391 70 - 75 65 - 70 1,865 1,688 0 800 1,315 1,455 1,471 1,545 1,396 1,851 1,738 280 2,234 1,738 280 2,234 0 1,346 1,080 1,091 1,123 1,381 1,102 1,553 894 60 - 65 1,120 1,293 0 594 894 0 594 55 - 60 0 24 0 142 973 953 949 892 1,041 110 347 0 355 347 355 50 - 55 0 0 0 0 688 707 662 582 666 0 444 0 444 0 Below 50 0 0 0 0 1,042 882 883 671 883 0 38 38 Min. Temp. 60.8 59.4 67.8 58.1 33.9 34.4 34.4 37.0 35.4 59.2 49.1 66.0 56.4 49.1 66.0 56.4 Mo./Hr. . Day Type 5 5 1 5 4 5 5 5 5 5 5 5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3 REPLACE FLUORESCENT FIXTURES

------ MONTHLY ENERGY CONSUMPTION ------

	ELEC	DEMAND	STEAM		STEAM DMND
	Off Peak	On Peak	On Peak	WATER	On Peak
Month	(kWh)	(kW)	(Therm)	(1000 Gl)	(Thrm/hr)
Jan	135,416	667	12,925	0	65
Feb	122,519	667	12,105	0	65
March	147,735	667	10,306	0	65
April	123,809	667	3,053	0	52
May	159,200	779	0	51	0
June	164,416	835	0	- 87	0
July	163,349	885	0	158	0
Aug	172,958	844	0	97	0
Sept	145,106	807	0	49	0
Oct	135,567	667	2,033	0	4.3
Nov	127,595	667	5,605	0	62
Dec	128,968	667	11,211	0	65
Total	1,726,640	885	57,237	442	65

Building Energy Consumption =

72,696 (Btu/Sq Ft/Year)

Source Energy Consumption = 158,402 (8tu/Sq Ft/Year)

Floor Area = 159,799 (Sq ft)

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref	Equip					Mon	thly Con	sumption						
Num	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	0ct	Nov	Dec	Total
0	LIGHTS													
	ELEC	50971	46117	55825	48544	53398	53398	48544	55825	48544	53398	48544	48544	611,651
	PK	265.3	265.3	265.3	265.3	265.3	265.3	265.3	255.3	265.3	265.3	265.3	265.3	265.3
- 1	MISC LD		1											
_	ELEC	0	0	. 0	0	- 0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
_	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													•
_	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
4	P STEAM	0	. 0	0	0	0	0	0	0	0	0	0	0	٥
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0
		• • • • • • • • • • • • • • • • • • • •		• • • • • • • • • • • • • • • • • • • •	• • •	V. 0	0.0	V. c	0.0	, 0.0	0.0	0.0	V.V	٧.٧
5	MISC LD													
	P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
, 6	MISC LD													
	P CHILL	. 0	0	0	0	0	0	0	0	0	0	0	0	0
	PX	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1001S		2-\$1	G CTV <5	55 TOKS									
	ELEC	0	0	0	C	11057	16273	28674	18082	10430	0	0	- 0	84,515
	PK	0.0	0.0	0.0	0.0	83.2	139.5	188.6	147.6	110.9	0.0	0.0	0.0	188.6
1	EQ5100		COOL	ING TOWE	.R									
4	ELEC	0	0	0	0	5115	5115	4650	5348	4650	0	0	0	24,878
	PK	0.0	0.0	0.0	0.0	23.3	23.3	23.3	23.3	23.3	0.0	0.0	0.0	23.3
1	EQ5100		COOL	ING TOWE	R									
ida de la Sula esta j	WATER	0	0	0	0	51	87	158	97	49	0	0	0	442
	PK	0.0	0.0	0.0	0.0	0.5	8.0	1.0	0.8	0.6	0.0	0.0	0.0	1.0
1	EQ5001		CHIL	LED WATE	R PUMP (	C.V.								
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010		COND	ENSER WA	TER PUMA	C.V.								
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5300		CONT	ROL PANE	L & INTE	ERLOCK								

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

		LHUL ILUUK	ESCENI FIXI	UNES											
		ELEC PK	0.0	0.0		0.0	220 1.0	220 1.0	200 1.0	230 1.0	200 1.0	0.0	0.0	0.0	1,070 1.0
	2	<b>EQ</b> 1000		PR	EVENTS CO	OOLING EN	ERGY								
		ELEC	0	0		0	0	0	0	0	0	0	0	0	0.0
		PK	0.0	0.0	0.0	0.0	.0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2	EQ5001				TER PUMP	C.V.								
		ELEC	0	0		0	0	0	0	0	0	0	0	0	0
		PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2	EQ5010		CO	NDENSER W	NATER PUM	P C.V.								
		ELEC	0	0		0	- 0	0	0	0	0	0	0	0	. 0
		PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1	EQ4003		FC	CENTRIF.	FAN C.V									
		ELEC	9754	8825	10683	9290	10219	10219	9290	10683	9290	10219	<b>9</b> 290	9290	117,051
		PΚ	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4
	1	EQ4003		FC		FAN C.V.									
		ELEC	2276	2059	2493	2168	2384	2384	2168	2493	2168	2384	2168	2168	27,312
		PK	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
	2	EQ4003		· FC	CENTRIF.	FAN C.V.									
		ELEC	0	. 0	0	0	0	0	0	0	0	0	0	0	0
		PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	3	EQ4003				FAN C.V.	-								
		ELEC	13975	12644	15305	13309	14640	14640	13309	15305	13309	14640	13309	13309	167,695
		PK	66.5	66.5	<b>6</b> 6.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5
yar Mily	3	EQ4003				FAN C.V.									
		ELEC	1747	1580	1913	1664	1830	1830	1664	1913	1664	1830	1664	1664	20,962
		PK	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
	5	EQ4003				FAN C.V.									
		ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	19076	240,355
	 :	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
	5	EQ4003		FC	CENTRIF.	FAN C.V.									
		ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	30,044
		PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
		EQ4003		FC	CENTRIF.	FAN C.V.									- C.1.
	ii.	ELEC	20030	18122	21937	19076		20983	19076	21937	19076	20983	19076	19076	240,355
		PK	95.4	95.4	95.4	95.4		95.4	95.4	95.4	95.4	95.4		95.4	95.4
	6	EQ4003		FC	CENTRIF.	FAN C.V.									
		ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	30,044
		PΚ	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
	1	EQ2101		PUR	CHASED D	ISTRICT S	TEAM							-	
		P STEAM	2215	2075	1750	521	0	0	0	0	0	340	961	1921	9,783
		PK	11.1	11.1	11.1	8.9	0.0	0.0.	0.0	0.0	0.0	8.3	10.7	11.1	11.1
	1	EQ5020		HEA	T WATER (	CIRC. PUM	P C.V.								
														-	

Trane Air Conditioning Economics

By: Trane Customer Direct Service Network

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3

REPLACE FLUORESCENT FIXTURES

	ELEC	6264	5667	6294	2863	0	0	0	0	0	2416	5011	5966	34,481
75. 3 . 1 .	PK	29.8	29.8	29.8	29.8	0.0	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8
i i Luan	POFACE		00110											
1	EQ5061				RETURN PU	MΡ								
: . <sup>6</sup>	ELEC	117	106	118	54	0	0	0	0	0	45	94	112	645
	PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
2	EQ2101		PHRO	HASED DI	STRICT S	TEAM								1 ( ) 1 ( )
i T	P STEAM	10710	10030	8556	2532	0	0	0	0	0	1693	4644	9289	47,454
	PK	53.6	53.6	53.6	43.3	0.0	0.0	0.0	0.0	0.0	39.9	51.6		
	- Γ <b>Λ</b>	33.0	٥٠.٥	33.0	43.3	0.0	0.0	<b>V.</b> 0	0.0	0.0	37.7	31.0	53.6	53.6
2	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	5220	4723	5717	2983	- 0	0	0	0	0	3405	4574	4971	31,593
	PK	24.9	24.9	24.9	24.9	0.0	0.0	0.0	0.0	0.0	24.9	24.9	24.9	24.9
2	EQ5061		COND	ENSATE F	RETURN PU	MP								
	ELEC	26	23	28	15	0	0	Û	0	0	17	23	25	157
	PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
3	EQ2000		pprv	ENT SUM	OF HEAT	ENERGY								7
	GAS	0	0	0	0	0	0	С	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	r IV	٧.٧	0.0	0.0	V.V	V.V	0.0	0.0	0.0	V.V	0.0	0.0	0.0	0.0
3	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

## UTILITY PEAK CHECKSUMS - ALTERNATIVE 3 REPLACE FLUORESCENT FIXTURES

	U	Ţ	I	L	I			Y	- 1	)	E	Α	K		C	К	E	C	K	S	U	M	S	
--	---	---	---	---	---	--	--	---	-----	---	---	---	---	--	---	---	---	---	---	---	---	---	---	--

Utility	ELECTRIC	DEMAND
---------	----------	--------

Peak Value 884.5 (kW) Yearly Time of Peak 13 (hr) 7 (mo)

Hour 13 Month 7

Eqp. Ref. Num.	Equipment Code Name			Equipment	Description	Utility Demand (kW)	Percnt Of Tot (%)	
Cooling Eq	uipment				-			
1	E01001S	2-STG CTV <	555 T	ONS		272.5	30.81	
Sub Total						272.5	30.81	
Sub Total						0.0	0.00	
Air Moving	Equipment							
1 3 5 6		SUMMATION OF SUMMATION OF SUMMATION OF	FAN FAN	ELECTRICAL ELECTRICAL	DEMAND DEMAND	57.3 74.9 107.3	8.46 12.13	
Sub Total					***	346.8	39.20	
Sub Total						0.0	0.00	
Miscellane	DUS							
Lights						265.3	29.99	
Base Utili	ities					0.0		
Misc Equip	oment					0.0		
Sub Total						265.3	29.99	
Grand Total	·					884.5	100.00	

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*************************
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**
       TRACE
            600
                ANALYSIS
                             **
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¥ ¥
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 122

Weather File Code:

CARLISLE

Location:

ENERGY SAVINGS OPPORTUNITY STUDY

Latitude: Longitude: 40.2 (deg)

77.2 (deg)

Time Zone:

5

Elevation:

475 (ft)

Barometric Pressure:

29.2 (in. Hg)

Summer Clearness Number: 1.00 Winter Clearness Number: 1.00 Summer Design Dry Bulb: 92 (F) Summer Design Wet Bulb: 72 (F) Winter Design Dry Bulb:

Summer Ground Relectance:

4 (F)

Winter Ground Relectance:

0.20 0.20

Air Density:

0.0742 (Lbm/cuft)

Air Specific Heat:

0.2444 (8tu/15m/F)

Density-Specific Heat Prod:

1.0882 (Btu-min./hr/cuft/F) 4,790.2 (Btu-min./hr/cuft)

Latent Heat Factor: Enthalpy Factor:

4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May System Simulation Period: January To December

To September

Cooling Load Methodology:

CLTD/CLF (Transfer Function Method)

Time/Date Program was Run:

12:55:35 2/ 2/94

Dataset Name:

C81228 .TM

1

AIRFLOW - ALTERNATIVE 4

------ S Y S T E M S U M M A R Y ------ S Y S T E M S U M M A R Y ------- (Design Airflow Quantities)

				Main			Auxil.	Room
System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
÷,								
1	TRH	10,853	36,175	36,175	36,175	10,853	0	0
- 2	SZ	0	17,730	17,730	17,730	0	0	17,730
3	INDFP	5,830	19,435	19,435	36,448	22,843	37,165	0
4	UH	0	0	1,835	0	0	0	0
5	DD	8,357	27,856	27,856	28,824	9,325	0	0
ar 6	DD	8,357	27,856	27,856	28,824	9,325	0	0
Totals		33,397	129,052	130,887	148,000	52,345	37,165	17,730

CAPACITY - ALTERNATIVE 4
HEAT RECOVERY

(Design Capacity Quantities)

			Coo	ling					Heating			
System Number	System Type	Capacity		Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	•	_	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (8tuh)	Heating Totals (Btuh)
1	TRH	81.5	0.0	0.0	81.5.	-68,182	0	-480,162	0	0	0	-548,345
2	SZ	3.2	0.0	0.0	3.2	-9,837	0	-106,277	0	0	0	-9,837
3	INDFP	46.4	102.4	0.0	148.8	-680,963	-1,230,942	0	0	0	0	-1,911,905
4	UH	0.0	0.0	0.0	0.0	-6,715	0	0	0	. 0	0	-6,715
. 5	DD	63.1	0.0	0.0	63.1	~245,454	0	-365,035	0	0	0	-610,489
6	DD	63.1	0.0	0.0	63.1	-245,454	0	-365,035	0	0	0	-610,489
Totals		257.3	102.4	0.0	359.7	-1,256,606	-1,230,942	-1,316,509	0	0	0	-3,697,779

The building peaked at hour 14 month 7 with a capacity of 257.3 tons

ENGINEERING CHECKS - ALTERNATIVE 4 HEAT RECOVERY

----- ENGINEERING CHECKS------

			Percent		Coo.	ling		Heat	ing	
System	Main/	System	Outside	Cfm/	Cfm/	Sq Ft	Btuh/	Cfm/	8tuh/	Floor Area
Number	Auxiliary	Type	Air	Sq Ft	Ton	/Ton	Sq Ft	Sq Ft	Sq Ft	Sq Ft
1	Main	TRH	30.00	0.63	443.7	705.9	17.00	0.63	-9.53	57,549
2	Main	SZ	0.00	4.32	5,605.2	1,296.2	9.26	4.32	-2.40	4,100
3	Main	INDFP	30.00	0.47	418.7	891.2	13.46	0.47	-16.46	41,364
3	Auxiliary	INDFP	0.00	0.90	363.0	404.1	29.70	0.90	-29.76	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	441.4	429.7	27.92	1.03	-22.51	27,121
6	Main	DD	30.00	1.03	441.4	429.7	27.92	1.03	-22.51	27.121

System 1 Peak TRH - TERMINAL REHEAT

Peaked at Time ==>
Space   Ret. Air   Ret. Air   Net   Percht   Space   Percht   Space
Sens.   Lat.   Sensible   Latent   Total   Of Tot   Total   Sensible   Of Tot   Total   Space Sens   Tot Sens   Of Tot
Sens.   Lat.   Sensible   Latent   Total   Of Tot   Total   Sensible   Of Tot   Total   Space Sens   Tot Sens   Of Tot
Sens_Hat.   Sensible   Latent   Total   Of Tot   Sensible   Of Tot   Space Sens   Tot Sens   Of Tot
Envelope Loads (Btuh) (Btuh) (8tuh) (8tuh) (\$) \$ (8tuh) (\$) \$ (8tuh) (\$) \$ (\$) \$ (8tuh) (\$) \$ (\$) \$ (8tuh) (\$) \$ (
Skylite Solr 0 0 0 0.00 # 0 0.00 # 0 0.00 # 0 0.00 \$ 0 0.
Skylite Cond 0 0 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 Roof Cond 0 0 0 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0 0.00 * 0 0 0.00 * 0 0 0.00 * 0 0 0.00 * 0 0 0.00 * 0 0.00 * 0 0 0.00 * 0
Roof Cond 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Glass Solar 0 0 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0 0.00 * 0
Glass Cond 0 0 0 0 0.00 * 0 0.
Mall Cond
Partition 18,940
Exposed Floor 0 0 0.00 * 0 0.0
Infiltration 0 0 18,940 1.94 * 18,940 4.00 * -68,182 -68,182 100.00  Internal Loads
Sub Total==> 18,940
Internal Loads  Lights
Lights 398,781 0 398,781 40.76 * 424,020 89.45 * 0 0 0.00  People 63,941 65,941 6.54 * 31,097 6.56 * 0 0 0.00  Misc 0 0 0 0 0 0.00 * 0 0.00 * 0 0.00  Sub Total==> 462,722 C 0 442,722 47.30 * 455,117 96.00 * 0 0 0.00  Ceiling Load 0 0 0 0.00 * 0 0.00 * 0 0.00  Outside Air 0 0 0 406,913 41.59 * 0 0.00 * 0 0.00  Sup. Fan Heat 77,173 7.89 * 0.00 * 0 0.00  Ret. Fan Heat 18,007 1.84 * 0.00 * 0.00  Duct Heat Pkup 0 0 0.00 * 0.00  Duct Heat Pkup 0 0 0.00 * 0.00  Exhaust Heat -5,402 0 -5,402 -0.55 * 0.00 * 0 0.00  Terminal Bypass 0 0 0 978,353 100.00 * 474,057 100.00 * -68,182 -68,182 100.00
People       63,941       63,941       63,941       6.54 *       31,097       6.56 *       0       0       0.00         Misc       0       0       0       0       0.00       0       0.00       0       0.00         Sub Total==>       462,722       0       0       462,722       47.30 *       455,117       96.00 *       0       0.00         Ceiling Load       0       0       0       0.00 *       0       0.00       0       0.00         Ceiling Load       0       0       0       0.00 *       0       0.00       0       0.00         Outside Air       0       0       0       0.00 *       0       0.00       0       0.00         Sup. Fan Heat       77,173       7.89 *       0.00 *       0.00 *       0.00       0.00         Ret. Fan Heat       18,007       18,007       1.84 *       0.00 *       0.00 *       0.00         Duct Heat Pkup       0       0       0.00 *       0.00 *       0.00       0.00       0.00         Exhaust Heat       -5,402       0       -5,402       -0.55 *       0.00 *       0.00 *       0.00       0.00         **Cou
Misc 0 0 0 0 0 0.00 *
Sub Total==> 462,722
Ceiling Load 0 0 0 0.00 * 0 0.
Outside Air         0         0         406,913         41.59 *         0         0.00 *         0         0.00           Sup. Fan Heat         77,173         7.89 *         0.00 *         0.00 *         0.00           Ret. Fan Heat         18,007         18,007         1.84 *         0.00 *         0.00 *         0.00           Duct Heat Pkup         0         0         0.00 *         0.00 *         0.00 *         0.00           Exhaust Heat         -5,402         0         -5,402         -0.55 *         0.00 *         0.00 *         0.00           Terminal Bypass         0         0         0.00 *         0.00 *         0.00 *         0.00           Grand Total==>         481,661         12,605         0         978,353         100.00 *         474,057         100.00 *         -68,182         -68,182         -00.00
Sup. Fan Heat       77,173       7.89 *       0.00 *       0.00         Ret. Fan Heat       18,007       18,007       1.84 *       0.00 *       0.00         Duct Heat Pkup       0       0.00 *       0.00 *       0.00         0V/UNDR Sizing       0       0 -0.00 *       0 -0.00 *       0 0.00         Exhaust Heat       -5,402       0 -5,402 -0.55 *       0.00 *       0.00 *         Terminal Bypass       0       0 0.00 *       0.00 *       0.00 *         Grand Total==>       481,661       12,605       0 978,353 100.00 *       474,057 100.00 *       -68,182 -68,182 100.00
Ret. Fan Heat 18,007 18,007 1.84 * 0.00 * 0.
Duct Heat Pkup 0 0 0.00 * 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0 0.00 * 0.0
OV/UNDR Sizing       0       0 -0.00 *       0 -0.00 *       0 0.00         Exhaust Heat       -5,402       0 -5,402 -0.55 *       0.00 *       0 0.00         Terminal Bypass       0 0 0 0.00 *       0.00 *       0.00 *         Grand Total==>       481,661       12,605       0 978,353 100.00 *       474,057 100.00 *       -68,182 -68,182 100.00
Exhaust Heat -5,402 0 -5,402 -0.55 * 0.00 * 0 0.00  Terminal Bypass 0 0 0 0.00 * 0.00 * 0.00 *  Grand Total==> 481,661 12,605 0 978,353 100.00 * 474,057 100.00 * -68,182 -68,182 100.00
Terminal Bypass 0 0 0 0.00 * 0.00 * 0.00 * 0 0.00 *
* *  Grand Total==> 481,661 12,605 0 978,353 100.00 * 474,057 100.00 * -68,182 -68,182 100.00
이용하는 생활을 보고
WULKO ACT OFFICIALLY
Total Capacity Sens Cap. Coil Airfl Entering DB/WB/HR Leaving DB/WB/HR Gross Total Glass (sf) (%)
(Tons) (Mbh) (cfm) Deg F Deg F Grains Deg F Grains Floor 57,549
Main Clg 81.5 978.4 719.6 36,175 80.0 67.5 83.9 61.0 59.3 74.8 Part 16,570
Any 61 a 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Ont Work 0.0 0.0 0.0
Totals 81.5 978.4
mail V . U (
Annality Cail Aight Ful I - A st Walt at A st
(MLL) (-t-) One 5 of mig
M. 1. 11. (0.0 7/17) (0.0 (0.7 m)
0.00
Opt Vent 0.0 0 0.0 0.0 Rm Exh 0 0 Htg Cfm/SqFt 0.63 Fn BldTD 0.4 0.4
Total -548.3 Auxil 0 0 Htg 8tuh/SqFt -9.53 Fn Frict 1.1 1.1

System 2 Peak SZ - SINGLE ZONE

*********		COOLING COIL	PEAK ****	*******	*******	***** CLG	SPACE	PEAK ****	***** HEA	TING COIL F	PEAK	****	***1
Peaked at Time		Mo/Hr:	•			* Mo,	/Hr: 7	7/16 *		Mo/Hr: 13	3/ 1	4	
Outside Air ==	> (	DADB/WB/HR:	<b>9</b> 1/ 73/ 98.	0		* 04	ADB: 9	11 *		OADB:	4 .		d'a.
						*		*		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	إضفارك		ŊŊ
	Space	e Ret. Air	Ret. Air	Net	Percnt	* S;	эасе	Percnt *	Space Pea	ak Coil F	<sup>j</sup> eak	Pe	rent
	Sens.+Lat	. Sensible	Latent	Total	Of Tot	* Sensi	ible	Of Tot *					Tot
Envelope Loads	(Btuh)	) (Btuh)	(Btuh)	(Btuh)	(%)	* (81	tuh)	(%) *	(8tu		tuh)		(\$)
Skylite Solr	(	0		0	0.00	*	Ò	0.00 *	•	0	Ó		0.00
Skylite Cond	(	) 0		0	0.00	*	0	0.00 *		0	0	1.7	0.0
Roof Cond	(	860		860	2.26	*	0	0.00 *			,224	. 2.	4.5
Glass Solar	595	5 0		595	1.57	*	595	1.71 *			0		0.0
Glass Cond	239	9 0		239			239	0.69 *			,139		5.7
Wall Cond	747	183		929			747	2.14 *	,		,870	1.6	9.6
Partition	(			0			0	0.00 *	,	_	0	1.7	0.0
Exposed Floo	r (	)		0			0	0.00 *		0	0		0.0
Infiltration				0			0	0.00 *		0	0		0.0
Sub Total=>>	1,58			2,623			,581	4.54 *		•	,234		0.0
Internal Loads	1,00			1,010		·	,001	*	•		,204	100	v. V
Lights	30,623	5 0		30,523			623	87.96 *		0	Δ.		0.0
People	4,712			4,712			223	6.38 *		0	0		0.0
Misc	7,71		0	0			0	0.00 *		0	0		0.0
Sub Total==>		-	•	35,335			845	94.34 *		0			
Ceiling Load	1,918			0,303			389	1.12 *		-	0		0.0
Outside Air	1,710	•		0			0	0.00 *			0		0.0
Sup. Fan Heat	`	, ,	V	0			U			0	0		0.0
Ret. Fan Heat		0		0				0.00 *			0		0.0
Duct Heat Pkup		0		0				0.00 *			0		0.0
OV/UNDR Sizing	(			•	.,		•	0.00 *		^	0		0.0
Exhaust Heat	,	0	C	0 0			0	-0.00 *		0	0		0.0
Terminal Bypas:	•	0	0	0				0.00 *			0		0.0
Terminal bypas	•	U	U	Ų	0.00			0.00 *			0	(	0.0
Cuand Tatalan	70 074	.07/	۸	77 050		*	245	*					
Grand Total==>	38,834	-876	0	37,755	100.00	<sup>‡</sup> 34,	815	100.00 *	-3,66	,8 -7,	,234	100	0.00
		·c00	ING COLL S	FLECTION						ADEAC			
Tota		Sens Cap.							Gross Tota				
(Ton:		(Mbh)		Dag F Dag	ny vermorni c E - Crain			Grains			ss (s	1) (	(6)
· · · · · · · · · · · · · · · · · · ·	.2 38.0		17,730					99.1		4,100			
Aux Clg 0			3						Part	•			
Opt Vent 0			0		0.0		0.0	0.0 0.0	ExFlr	0		^	
Totals 3	.2 38.0		V	J.V (	U.U U.(	, U.U	0.0	U.U	Roof Wall	580		0	1
iotais o									HQ11	196		21	1.
HFQ	TING COTE SE	LECTION		AI	BELAMO (~#.	n \	r	NGINEERING	רעברעפ	TEMOCO	THE	c /=	١
^				Туре	Cooling					TEMPERA			
	-	fm) Deg F	Deg F	ype Vent	_	Heating	_	% OA Cfm/Saft	0.0	Type	Clg		Htg /o/
lain Htg	,	7,730 67.7	68.2	Infil	0	. 0		Cfm/Sqft		SADB	73.		68.
-		0 0.0	0.0		17 770	17 770	_	Cfm/Ton	5605.16	Plenum	76.		67.
Suv Sta		,730 67.7	73.2		17,730	17,730	-	Sqft/Ton		Return	79.		67.
-	(1) (3)	,130 01.1		Minofm Return	0	0		Btuh/Sqft		Ret/OA	76.		67.
Preheat -10		0 0 0		earnen.	0	17,730	NΩ	People	10	Runarnd	75.	0 6	68.
Preheat -10 Reheat	0.0	0 0.0	0.0										
Preheat -10 Reheat Humidif	0.0	0 0.0	0.0	Exhaust	0	0	Htg	% OA	0.0	Fn MtrTD	0.	0	٥.
Preheat -10 Reheat Humidif Opt Vent	0.0						Htg Htg		0.0 4.32			0 0	0.0

System 3 Block INDFP - 4-PIPE INDUCTION

************ Peaked at Time Outside Air ==:	==>	Mo∕Hr:	7/14		*******	* Mo/	SPACE Hr: ADB:	7/19 *		TING COIL P Mo/Hr: 13 OADB:	/ 1
Control of the contro	, un	190/ HO/ MK.	)1/ 14/102.v	V		*	100.	*		UHDD.	<b>4</b>
	Space	Ret. Air	Ret. Air	Net	Percnt	* Sr	oace	Percnt *	Space Pea	ak Coil P	eak Percnt
and the second	Sens.+Lat.	Sensible			Of Tot			Of Tot *	Space Ser		
Envelope Loads		(8tuh)		(Btuh)			tuh)	(%) *	(Btul		
Skylite Solr	0			0			0	0.00 *	,	0	0.00
Skylite Cond	0			0			0	0.00 *		0	0 0.00
Roof Cond	474			21,957			664	0.10 *		79 -73,	
Glass Solar	171,927	0		171,927			822	27.51 *	,		0 0.00
Glass Cond	53,830	0		53,830		•		5.93 *		37 -276,	
Wall Cond	113,330	16,902		130,232			977				
Partition	0			- 0			0	0.00 *	,	•	0 0.00
Exposed Floor	r 0			0	0.00	*	0	0.00 *		0	0 0.00
Infiltration	736,354			736,354	40.85	* 170,	578		-1,184,85	52 -1,184,	
Sub Total==>	1,075,915	38,386		1,114,301			123			25 -1,911,	
Internal Loads				•		*		*		, ,	
Lights	277,628	0		277,628	15.40	* 79,	744	11.80 *		0	0 0.00
People	45,248			45,248	2.51	* 6,	070	0.90 *		0	0 0.00
Misc	Ō	0	0	0	0.00	*	0	0.00 *		0	0 0.00
Sub Total==>	,	0	0	322,876	17.91	* 85,	814	12.70 *		0	0 0.00
Ceiling Load				0	0.00	* 23,	486	3.48 *	-47,8	11	0 0.00
Outside Air	0	0	0	252,361	14.00	*	0	0.00 *		0	0.00
Sup. Fan Heat				110,564				0.00 *			0.00
Ret. Fan Heat		13,820		13,820				0.00 *			0.00
Duct Heat Pkup		0		0				0.00 *			0.00
OV/UNDR Sizing	119			119			119	0.02 *		0	0.00
Exhaust Heat				-11,266				0.00 *	•		0 0.00
Terminal Bypass	5	0	0	0	0.00	*		0.00 *			0 0.00
y i	1 117 571	0/ 007				*		*			
Grand Total==>	1,413,564	26,287	0	1,802,776	100.00	* 675,	542	100.00 *	-1,838,93	36 -1,911,	905 100.00
		000		ri FATTAU							
	.) 0									AREAS	
	al Capacity										s (sf) (%)
(Tons			(cfm)	-	_	-		Grains		11,364	
Main Clg 46.		402.9	19,435		6.7 78.		57.7		Part	0	
Aux Clg 102. Opt Vent 0.	.4 1,228.4	7/1.3	٥١,١٥٥	73.0	4.2 /4. A.A	9 65.1 0 0.0	53.2	42.8		0	
Totals 148.	.0 0.0 .0 1 785 <i>1</i>	٧.٧	V	0.0	0.0 0.	0.0	0.0	0.0	Roof :	14,080	0 0
	.0 1,703.4								Wall	20,334	5,152 18
HFA1	FING COIL SEL	FCTION			RELOWS /of	m)		FNCTNEEDING	CHECKS	TEMBEDA	TURES (F)
	city Coil A					"', Heating		g % OA		Туре	
(Mt	oh) (cf	m) Dea F	Dea F	Vant	5 070	Λ	61	g Cfm/Sqft		SAD8	Clg Htg 65.1 96.7
Main Hto -68	31.0 19	435 64.5	96.7	Infil	17.013	17,013 19,435	U1	g Cfm/Jon		Plenum	76.1 64.4
Main Htg -68 Aux Htg -1,23	30.9 37.	165 68.0	98.5	Supply	19.435	19.435	01	g Sqft/Ton		Return	76.8 64.5
Preheat -	-0.0 19,	435 64.5	59.9	Mincfm	. 0	Λ	C1	g Stuh/Saft		Ret/OA	80.9 64.5
Reheat	0.0			Return	19 475	19,435		. People		Runarnd	75.0 68.0
Humidif	0.0				5,830	17,703	и И+	. 100p10 σ % ΠΔ	0.0	Fn MtrTD	1.3 1.3
Opt Vent	0.0	0 0.0 0 0.0		Rm Exh	3,830	0	Hf	g % OA g Cfm/SqFt	0.0	Fn 8ldTD	1.0 1.0
Total -1,91	11 9	v.v.	۷.۷	Auxil	37 145	37,165		g Btuh/Sqft		Fn Frict	
10tal "1,71	14.7			HUAII	31,103	57,105	пі	g bruit/ourt	-10.40	. 111 1111 <b>1</b>	2.9 2.9

., .															
٠	System	4	Block	UH	- UNIT HE	ATERS									
													* **.	1111	
	4					******	*****	*****	*****		CE PEAK ****	****** HEA	TING COIL	. PEAK *	******
	Peaked at			Mo/Hr:	•				*	Mo/Hr:	*	(	Mo/Hr:	13/ 1	
1	Outside Ai	r ==>	0.9	NDB/WB/HR:	0/ 0/ 0.	0			*	OADB:	0 >	ť	:8CAO	4	
, .		iş.							*		*	•			•
	Negation was executed		Space		Ret. Air				*	Space		•		Peak	Percnt
	Santa Comment		ens.+Lat.	Sensible		Tot				Sensible				Sens	Of Tot
	Envelope L		(Btuh)	(Btuh)		(Btu		( - /	*	(Btuh)		(	ıh) i	(Btuh)	(%)
	Skylite		0	0					*	0			0	0	0.00
· .	Skylite		0	0					*	0	• • • •		0	0	0.00
	Roof Con		0	0					*	0	*		0	0	0.00
	Glass So		0	0				0.00	*	0	0.00		0	- 0	0.00
	Glass Co		0	0					*	0	0.00		0	0	0.00
	Wall Con		0	0					*	0	0.00		0	0	0.00
7.1	Partitio		0						*	0	0.00	-,		-6,715	100.00
a Vina	Exposed		0						*	0	0.00		0	0	0.00
	Infiltra		. 0	^				0.00	*	0	0.00		0	( 715	0.00
<del>.</del>	Sub Tota		0	0			0	3.55	*	0	0.00	-6,	/15	-6,715	100.00
	Internal L	2080.	0	C			Λ		*	0	0.00	<b>`</b>	0	۸	0.00
	Lights People		0	V					*	0	0.00		0	٨	0.00
	neopie S ∶Misc		0	Û	0				*	٥	0.00	· k	٨	0	0.00
	Sub Tota	1==5	0	٠	0				*	0	0.00	` <b>(</b>	0	0	0.00
	Ceiling Lo		٥	0	•				*	0	0.00		0	0	0.00
	Outside Ai		0	0					*	0			0	0	0.00
	Sup. Fan H		•	v	•				*	·	0.00	ţ	•	0	0.00
	Ret. Fan H			0					*		0.00	ķ		0	0.00
	Duct Heat			)					*		0.00	ķ		0	0.00
	OV/UNDR Si		0				0	0.00	*	0	0.00	ķ	0	0	0.00
	Exhaust He	at		Ĵ	0		0	0.00	*		0.00	<b>.</b>		0	0.00
	Terminal 8	lypass		0	0		0	0.00	*		0.00	*		0	0.00
11.	`								*			ŧ			
53.	Grand Tota	1==>	0	0	0		0	0.00	*	0	0.00	k -6,	715	-6,715	100.00
i (le) la : la <del></del> la : la <del></del>				000	HIND OOTL C	CLEATION							A D F A		
		Total (	lananity	Sens Cap.	LING COIL S	-ELLUIIUN- Cata	ring D	B/W8/H	10	Looving	D8/W8/HR	Gross To	AREA	lass (sf	(%)
		(Tons)	apacity (Mbh)	(Mbh)	(cfa)	Dag F					F Grains	Floor	2,544	1922 (2)	) (0)
		0.0	0.0	0.0	(614)	0.0	0.0	0.			0.0	Part	1,632		
	Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.			0.0	ExFlr	0		
34 A 24 A	Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.			0.0	Roof	ō		0 0
		0.0	0.0									Wall	0		0 0
1 - - y <sub>1</sub> - è		-HEATING	COIL SEL	ECTION			AIRFLO	WS (cf	m)		ENGINEERIN	G CHECKS	TEMP	ERATURES	(F)
4		Capacity	/ Coil A	Airfl Ent	Lvg	Type	Coc	oling	Heat	ing	Clg % OA	0.0	Type	Clg	Htg
		(Mbh)	-	-	-	Vent		0			Clg Cfm/Sqft		SAD8	0.0	
	Main Htg	-6.7				Infil		0			Clg Cfm/Ton	0.00	Plenum		
517	Aux Htg	0.0		0 0.0		Supply		0	1		Clg Sqft/Ton		Return		
	Preheat	0.0		0 0.0		Mincfm	•	0			Clg Btuh/Sqf		Ret/OA		
	Reheat	0.0		0 0.0		Return		0	1		No. People	0	Runarn		
	Humidif	0.0		0 0.0		Exhaust		0			Htg % OA	0.0	Fn Mtr		
	Opt Vent	0.0		0 0.0	0.0	Rm Exh		0			Htg Cfm/SqFt		Fn Bld		
	Total	-6.	1			Auxil		0		0	Htg Btuh/SqF	t -2.64	. Fn Fri	ct 0.1	0.0
												*			

System 5 Block DD - DOUBLE DUCT

					*******						TING COIL PEA	
Peaked a			Mo/Hr:					/Hr:	•		Mo/Hr: 13/	
Outside i	Air ==>	OA	DB/WB/HR: S	91/ 74/105.0	)		* 01	ADB:	91 *		OAD8: 4	
							*		*		1,-	
		Space	Ret. Air	Ret. Air	Net	Percnt	* S	pace	Percnt *	Space Pea	ak Coil Pea	< Perónt
	S	ens.+Lat.	Sensible	Latent	Total	Of Tot	* Sens:	ible	Of Tot *	Space Ser	ns Tot Sens	of Tot
Envelope	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	* (B	tuh)	(%) *	(Btul	h) (Btuh	) (%)
Skylite	e Solr	0	0		0	0.00	*	0	0.00 *			0.00
Skylite		0	0		0			0	0.00 *		0	0.00
Roof Co		14,486	0		14,486			,221	5.75 *		36 -48,28	
Glass S		17,909	0		17,909			,285	5.78 *			
Glass (		4,840	0		4,840			,167	1.83 *		-	
Wall Co		4,161	526		4,687			,622	1.99 *		•	
Partiti		0	020		- 0	0.00		0	0.00 *		_	
	d Floor	0			0			0	0.00 *		0	
Infilt		33,323			33,323			, 324	5.79 *		03 -67,40	
Sub Tot		74,719	526		75,245			,619	21.14 *	•		
Internal		14,117	320		13,243	7.74	↑ J7 +	,017	Z1.14 *	•	56 -159,30	70.19
Lights		190,447	0		190,447	25.15	4 ΩΛΔ	070	· ·		^	
People		30,203	U		· · · · · · · · · · · · · · · · · · ·			,839	71.22 *		0	0.00
Misc		30,203	0	۸	30,203			,612	5.18 *		0	0.00
					0			0	0.00 *		0	0.00
Sub Tot		220,650	1 775	0	220,650			,452	76.40 *		0	0.00
Ceiling (		1,375	-1,375	^	0			,553	0.55 *	-4,62		0.00
Outside /		0	0	0	287,738			0	0.00 *		0	0.00
Sup. Fan					158,470				0.00 *			0.00
Ret. Fan			19,809		19,809				0.00 *		(	0.00
Duct Heat		<b>5 7</b> //	0		0			• , ,	0.00 *			0.00
OV/UNDR S	-	5,366	0.677	٨	5,366			,366	1.90 *			
Exhaust i			-9,934		-9,934				0.00 *			0.00
Terminal	Bypass		0	0	0	-0.00	<b>∓</b> 		0.00 *		•	0.00
 Chand Tal	+a1x	702 110	0.007	٨	707 747	100.00	· 001	000	100.00	200 7		
Grand IVI	ld1/	302,110	9,026	0	131,343	100.00	* Z81 <sub>1</sub>	,990	100.00 *	-229,33	31 -226,94	3 100.00
			C00i	ING COTE SE	TECTION						AREAS	
									B/WB/HR			(sf) (%)
	(Tons)	(Mbh)	(Mbh)						Grains		27,121	(21) (4)
Main Clg	63.1	757.3	577.1	27,856	-	3.3 87.	_	60.1		Part	0	
Aux Clg	0.0	0.0	0.0	•		0.0 0.		0.0			0	+ 1
Opt Vent	0.0	0.0	0.0	Ö		0.0 0.		0.0		Roof		0 0
Totals	63.1	757.3	• • • • • • • • • • • • • • • • • • • •	v	•••	,, , , , , , , , , , , , , , , , , , ,	0.0	٧.٧	0.0		1,613	
		, , , , ,								,,u11	1,010	400 27
********	HEATIN	G COIL SELE	ECTION		AI8	RFLOWS (cfi	m)		ENGINEERING	CHECKS	TEMPERATU	RES (F)
	Capacit	y Coil Ai	irfl Ent	Lvg .	Type	Cooling	Heating		g % OA			lg Htg
	(Mbh)	(cfr	n) Deg F	Deg F	Vent	8,357	. 0	Cl	g Cfm/Sqft	1.03		5.7 75.6
Main Htg	-245.	5 27,8		75.6	Infil	968	968	Cl	g Cfm/Ton			5.4 66.5
Aux Htg	0.			0.0	Supply	27,856	27,856	Cl	g Sqft/Ton			5.1 67.5
Preheat	-365.	0 27,8			Mincfm	0	0	Cl	g 8tuh/Sqft	27.92		0.4 67.5
Reheat	0.	0		0.0	Return	27,856	27,856	No	. People	65		5.0 68.0
Humidif	0.	0	0.0	0.0	Exhaust	8,357	0	Нt	g % OA	0.0		1.3 1.3
Opt Vent	0.	0	0.0	0.0	Rm Exh	0	0	Нt	. People g % OA g Cfm/SqFt	1.03		1.0 1.0
Total	-610.	5			Auxil	0	0	Ht	g Btuh/SqFt	-22.51	Fn Frict	
										,	•	

System 6 Block DD - DOUBLE DUCT

Peaked at Time		Mo/Hr:	7/14			* *	o/Hr:	7/16 *	•	Mo/Hr: 1		dan dari
Outside Air ==:	> 0A	D8/WB/HR:	91/ 74/105.	0		*	OADB:	91	(	OAD8:	4	
	Space	Rat Air	Ret. Air	Net	Darent	*	Space	Percnt 4	: C Encas Dr	eak Coil	Daal.	
	Sens.+Lat.	Sensible		Total			sible		•			Percnt Of Tot
Envelope Loads	(Btuh)	(Btuh)					Btuh)	(%)				(%)
Skylite Solr	0			(50011)		,	0	0.00	-		0	0.00
Skylite Cond		0		0			Ö			٥	0	0.00
	14,486			14,486			6,221			286 -48	-	21.28
	17,909	0		17,909			6,285	5.78	•		0	0.00
Glass Cond	4,840	0		4,840			5,167	1.83 *		590 -24		10.88
Wall Cond		526		4,687			5,622	1.99 *		577 -18		8.34
Partition				0			0	0.00	:	0	0	0.00
Exposed Floor	. 0			0			0	0.00 *		0	0	0.00
Infiltration	33,323			33,123				5.79 *		103 -67	.403	29.70
Sub Total==>	74,719	526		75,245			9,619				•	70.19
Internal Loads						*	,	*	•		,	
Lights	190,447	0		190,447	25.15	* 20	0,839	71.22 *		0	0	0.00
People	30,203			30,203			4,612	5.18 *		0	0	0.00
Misc	0	0	9	0			0			0	Ō	0.00
Sub Total==>	220,650	0	0	220,650			5,452	76.40 *		0	0	0.00
Ceiling Load	1,375	-1,375		0			1,553	0.55 *		27	0	0.00
Outside Air	0	0	0	287,738	37.99		. 0	0.00 *		0	0	0.00
Sup. Fan Heat				158,470				0.00 *			0	0.00
Ret. Fan Heat		19,809		19,809				0.00 *			0	0.00
Duct Heat Pkup		0		0				0.00 *			0	0.00
OV/UNDR Sizing	5,366			5,360	0.71	*	5,366	1.90 *	-67,6	48 -67	,648	29.81
Exhaust Heat		-9,934	ô	-9,934			,	0.00 *		-	0	0.00
Terminal Bypass		0	0	0	-0.00	*		0.00 *			0	0.00
						*		*				
Grand Total==>	302,110	9,026	0	757,343	100.00	* 28	1,990	100.00 *	-229,3	31 -226,	,948	100.00
distriction of the second		200	****				-					
Tota								DD /ND /UD				
(Tons	l Capacity	(Mbh)	(nfm)	Dear Day	ig ne/we/u	ik Le	aving	uo/wo/nk E Chaina			35 (\$1	) (%)
	1 757.3						νεg 4Λ	F Grains		27,121		
Aux Clg 0.		0.0	27,330		).0 0.				Part Exflr	0		
Opt Vent 0.			ů 0		).0 <b>0</b> .					8,563		0 0
Totals 63.		0.0	V	V. V	7.0 <b>v</b> .	0.0	٧.	0.0	Wall	1,613		0 0 60 29
w. TV									W411	1,010	7	00 1
НЕАТ	ING COIL SEL	ECTION		AIS	RELOWS (cf	m)		-ENGINEERING	CHECKS	TEMPERA	ATURES	(F)
	ity Coil A				Cooling	Heating		lg % OA	30.0	Туре	Clg	
(Mb	h) (cf	m) Deg F		Vent				lg Cfm/Sqft		SADB	65.7	-
	5.5 27,		-			96		lg Cfm/Ton		Plenum	75.4	
Aux Htg		0.0	0.0	Supply		27,85		lg Sqft/Ton		Return	76.1	
-	5.0 27,		60.5		0	,		lg Btuh/Sqft		Ret/OA	80.4	
Reheat	-	0.0	0.0	Return		27,85			65	Runarnd	75.0	
Humidif		0 0.0	0.0	Exhaust	8,357	,			0.0	Fn MtrTD	1.3	
	0.0	0.0	0.0	Rm Exh	0			tg Cfm/SqFt		Fn BldTD	1.0	
APE TORE			.,.	140. CV3	V		V 11	ty ormitour t	1.00	I II DIGID		

BUILDING U-VALUES - ALTERNATIVE 4 HEAT RECOVERY

----- BUILDING U-VALUES------

					Roo	m U-Val	ues				Room	Room
						/hr/sqf					Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	<pre>1 Total/Ave.</pre>	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
. 4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	<pre>1 Total/Ave.</pre>	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
Zone	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
11	TOILETS W RCOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	<pre>11 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	<pre>2 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
. 5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
. 7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
Zone	<pre>9 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
12	STAIRS W ROOF	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
System	<pre>3 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	74.1	15.63
13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	<pre>13 Total/Ave.</pre>	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	. 8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	14 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	15 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	<pre>16 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
Buildin	g	0.229	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	52.6	10.93

BUILDING AREAS - ALTERNATIVE 4

-----BUILDING AREAS-----

				Floor	Total		Eunanad						
		Maraka	na of	Area/Dupl		Partition	Exposed	Olan Sabt	01.1	Not Coof	و مناه مناه	м2 -	N-4 N-11
Room		Dupli					Floor	Skylight		Net Roof	Window	Win	
				Room (aaft)	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number	Description	Flr	IV.III	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	SUB BSMT, BSMT W		1	45,125	45,125	13,222	0	0	0	0	0	0	0
Zone					45,125	13,222	0	0	0	0	0	0	0
4	BSMT E		1	12,424	12,424	3,348	0	0	0	0	0	0	0
Zone	<pre>4 Total/Ave.</pre>				12,424	3,348	0	0	0	0	0	0	0
System	<pre>1 Total/Ave.</pre>				57,549	16,570	0	0	0	0	0	0	. 0
2	TOILETS, KITCHEN	1	1	3,520	3,520	0	0	0	0	0	21	11	174
Zone					3,520	0	0	0	0	0	21	11	174
11	TOILETS W ROOF	1	1	580	580	0	0	0	0	580	0	0	0
Zone	11 Total/Ave.				580	0	0	0	0	580	0	0	0
System	<pre>2 Total/Ave.</pre>				4,100	0	0	0	0	580	21	11	174
3	STAIRS	1	1	560	560	0	0	0	0	0	255	29	625
Zone	<pre>3 Total/Ave.</pre>				560	0	0	0	0	0	255	29	625
5	IST FL OFFICES	1	1	11,724	11,724	0	0	0	0	0	1,573	19	6,530
Zone	5 Total/Ave.				11,724	0	0	0	0	0	1,573	19	6,530
7	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	0	0	1,610	17	7,730
Zone	7 Total/Ave.				14,400	0	0	0	0	0	1,610	17	7,730
9	3RD FL OFFICES	1	1	14,400	14,400	0	0	0	0	14,400	1,610	17	8,010
Zona	9 Total/Ave.				14,400	0	0	0	0	14,400	1,610	17	8,010
12	STAIRS W ROOF	1	1	280	280	0	0	0	0	280	105	25	307
Zone	12 Total/Ave.				280	0	0	0	0	280	105	25	307
System	3 Total/Ave.				41,364	0	0	0	0	14,680	5,152	18	23,202
13	SUPPLY STORAGE	1	1	2,544	2,544	1,632	0	0	0	0	0	0	C
Zone	<pre>13 Total/Ave.</pre>				2,544	1,632	0	0	0	0	0	0	0
System	4 Total/Ave.				2,544	1,632	0	0	0	0	0	0	·. 0
6	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0 -	0	0	0	250	19	1,038
Zone	6 Total/Ave.				9,884	0	0	0	0	0	250	19	1,038
8	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	55
Ione	<pre>8 Total/Ave.</pre>				8,674	0	0	0	0	0	105	66	55
10	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	<pre>10 Total/Ave.</pre>				8,563	0	0	0	0	8,563	105	64	60
System	5 Total/Ave.				27,121	0	.0	0	0	8,563	460	29	1,153
14	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	<pre>14 Total/Ave.</pre>				9,884	0	0	0	0	0	250	19	1,038
15	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	55
Zone	15 Total/Ave.				8,674	0	0	0	0	0	105	66	·· 55
16	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	<pre>16 Total/Ave.</pre>				8,563	. 0	0	0	0	8,563	105	64	60
System	6 Total/Ave.				27,121	0	0	0	0	8,563	460	29	1,153
Buildin	g				159,799	18,202	0	0	0	32,386	6,095	19	25,681

Trane Air Conditioning Economics
By: Trane Customer Direct Service Network

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ASHRAE 90 ANALYSIS - ALTERNATIVE 4 HEAT RECOVERY

-----ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (CTTVr) = 3.96 (Btu/Hr/Sq Ft)Wall Overall Thermal Transfer Value (OTTVw) = 24.46 (Btu/Hr/Sq Ft) SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4 HEAT RECOVERY

## System Totals

Percent	Cool	ing Loa	ıd	Heati	ng Load		Cooling	Airflow		Heating	Airflow	
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	18.0	0	0	-190,203	13	170	6,544.3	0	0	0.0	0	0
5 - 10	36.0	0	0	-380,406	10	129	13,088.7	0	0	0.0	0	0
10 - 15	54.0	1	12	-570,609	- 7	91	19,633.1	0	0	0.0	0	0
15 - 20	71.9	8	86	-760,811	3	34	26,177.4	0	0	0.0	0	0
20 - 25	89.9	11	120	-951,014	1	16	32,721.7	0	0	0.0	0	0
25 - 30	107.9	5	56	-1,141,217	7	89	39,266.1	0	0	0.0	0	0
30 - 35	125.9	10	110	-1,331,420	10	132	45,810.5	0	0	0.0	0	0
35 - 40	143.9	23	245	-1,521,623	13	168	52,354.8	0	0	0.0	0	0
40 - 45	161.9	4	42	-1,711,826	18	228	58,899.2	0	0	0.0	0	0
45 - 50	179.8	8	90	-1,902,029	18	231	65,443.5	0	0	0.0	0	0
50 - 55	197.8	6	67	<b>-2</b> ,092,231	Û	0	71,987.9	0	0	0.0	0	0
55 - 60	215.8	. 4	42	<b>-2,282,434</b>	0	0	78,532.2	0	0	0.0	0	0
60 - 65	233.8	3	35	<b>-2,472,637</b>	0	0	85,076.6	0	0	0.0	0	0
65 - 70	251.8	7	75	<b>-2</b> ,662,840	0	0	91,620.9	0	0	0.0	0	0
70 - 75	269.8	7	` 75	<b>-2,853,043</b>	0	0	98,165.3	0	0	0.0	0	0
75 - 80	287.8	1	15	-3,043,246	0	0	104,709.6	0	0	0.0	0	0
80 ~ 85	305.7	0	0	-3,233,448	0	0	111,254.0	0	0	0.0	0	0
85 - 90	323.7	0	0	<b>-3,4</b> 23,652	0	0	117,798.3	100	2,520	0.0	0	0
90 - 95	341.7	0	0	<b>-3,</b> 613,854	0	0	124,342.7	0	0	0.0	0	0
95 - 100	359.7	0	0	-3,804,057	0	0	130,887.0	0	0	0.0	0	0
Hours Off	0.0	0	7,690	0	0	7,472	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4 HEAT RECOVERY

					RUT	ו ח ו	N G	TFM	PFR	A T U	R F P	ROF	TIF	9					4
Tomponotuun								, , ,			'		1	J		. 1 %			1.50
Temperature	1		~~~~~ ^							Zone N								<u></u>	-
Range	1	4	2	11	3	5	1	9	12	13	6	8	10	14	15	16			
(F)																	)		
Max. Temp.	82 6	81.5	201 1	120 2	86.4	85 1	94.9	97 7	25 7	96.2	Ω5 1	99 5	9/5	Q5 1	88.5	2 1.0			2
Mo./Hr.		10 23					7 24	7 22		8 17	7 3		7 4	7 7	10 1	04.J		<u> </u>	
Day Type	2					1 1	1 4	1 22	1 20	2	, 5	2	, ,	/ 5	2	5			
24, ,,,,,	-	-	-	-	1	-	•	٦	٦	_	J	<u>.</u>	J	J	2	J			
									Niii	mber o	f Hour	s						A Comment	
Above 100	0	0	8.016	4,086	0	0	0	0			0		0	0	0				•
95 - 100	0	0				0	0	0	-	_	0	0	•	-	•	0			; ;
90 - 95	0	0	91	1,239		0	0	0	-	1,494	0	0	0	-	0	0			. '
85 - 90	0	0		253		0	0	0		1,602	20	537	0	20	537	0		• . •	
80 - 85	954	517	227	585	1,161	1.221	1,140	704					1.585		3,338	1.585			i
75 - 80	5,027	2,814	136												4,263				
70 - 75	1,202	3,711	0	1,256				694		1,435			1,333		•	1,333			ă.
65 - 70	1,418	1,516	0	726	1,391	1,535	1,595	1,677	1,447	1,579	1,313	27	1,400	1,313		1,400		73	·
60 - 65	159	202	0	178	1,107	1,076	1,088	1,366	1,166	377	580	0	504	580	0	504			
55 - 60	0	0	0	0	915	869	900	789	953	0	293	0	182	293	. 0	182		- {	
50 - 55	0	0	0	0	671	632	626	546	658	. 0	363	0	0	363	0	0			
Below 50	0	0	0	0	1,014	874	845	625	847	0	0	0	0	0	0	0			
																		•	
Min. Temp.	63.8	63.0	68.0	63.6	34.0	34.6	34.7	37.4	35.6	61.7	50.3	67.9	57.5	50.3	67.9	57.5		.*	9
Mo./Hr.	1 8	1 10	1 1	2 6	2 11	2 7	2 7	2 7	2 7	1 6	2 7	1 7	1 7	2 7	1 7	1 7			
Day Type	5	5	1	5	4	5	5	5	5	5	5	1	5	5	i	5			

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4 HEAT RECOVERY

------ MONTHLY ENERGY CONSUMPTION------

, The second second	ELEC	DEMAND	STEAM		STEAM DMND
	Off Peak	On Peak	On Peak	WATER	On Peak
Month	(kWh)	(kW)	(Therm)	(1000 Gl)	(Thrm/hr)
Jan	163,358	813	11,985	0	65
Feb	147,800	813	11,328	0	65
March	178,338	813	8,748	0	63
:April	149,213	813	2,215	0	47
May	192,292	948	0	81	0
June	199,334	1,020	0	- 127	0
July	196,533	1,068	0	192	0
Aug	209,689	1,021	0	139	0
Sept	175,132	971	0	75	0
Oct	163,049	813	1,307	0	45
Nov	152,314	813	4,498	0	59
Dec	155,579	813	10,159	0	64
Total	2,082,650	1,068	50,241	614	65

Source Energy Consumption = 75,922 (Btu/Sq Ft/Year) 175,378 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4
HEAT RECOVERY

EQUIPMENT ENERGY CONSUMPTION------------------

Ŋ.											x			
	Equip Code	Jan	Feb	 Mar	Apr	Mon May	thly Con June	sumption July	Aug	Sep	 Oct	Nov	Dec	Total
ጋት በ	LIGHTS													
, 0	ELEC	78913	71397	86428	75155	82671	82671	75155	86428	75155	82671	75155	75155	946,954
	PK	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7
1	MISC LD													
	ELEC	0	0	0	0	- 0	0	0	0	0	0	0	0	. 0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 →
2	MISC LD	Δ.	٥		4	•					_			_
	GAS PK	0.0	0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0 0.0	0.0
		V.V	0.0	V. 0	0.0	V.0	<b>v.</b> v	0.0	0.0	0.0	0.0	0.0	0.0	<b>0.0</b>
3	MISC LD		_	_	_	_								
	OIL PK	0.0	0 0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0
	t IV	0.0	0.0	٧.٧	<b>v.</b> 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 %
. 4	MISC LD	_												
	P STEAM PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	0 0.0	0	0	0	0	0	0
	۲۸	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH20	0 0.0	0	0	0 0.0	0	0	0	0	0	0	0	0	0
	PK	0,0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD	۸	•	•	•	•	^	•	•					_
	P CHILL PK	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.0	<b>0</b> 0.0	0 0.0	. 0.0
	, K	•.•		0.0	0.0	V. 0	V.V	V. V	٧.٠	٧.٧	٧.٠	۷.۷	V.V	. 0.0
. 1	EQ1001S			TG CTV <										* .
	ELEC PK	0 0.0	0 0.0	0 0.0	0.0	14876 106.5	21919 178.5	35246 226.8	24209 179.2	13865 129.8	0.0	0 0.0	0 0.0	110,115 226.8
	r IV	٧.٠	۷.۷	٧.٧	V.V	100.5	170.5	220.0	117.1	127.0	0.0	۷.۷	0.0	220.0
1	EQ5100	_		LING TOW										
	ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	5115 23.3	5115 23.3	4650 23.3	5348 23.3	4650 23.3	0 0.0	0.0	0 0.0	24,878
	r n	0.0	۷.۷	0.0	0.0	23.3	23.3	23.3		25.5		0.0	0.0	23.3
1. 4	EQ5100			LING TOW							,	3		**
(1)	WATER	0	0	0	0	81	127	192	139	75	0	Q.ª	-	614
	PK	0.0	0.0	0.0	0.0	0.6	1.0	1.2	1.0	0.8	0.0	0.0	0.0	1.2
1	EQ5001			LLED WAT	ER PUMP									
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010		CON	DENSER W	ATER PUM	P C.V.								
	ELEC	- 0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5300		CON	TROL PAN	EL & INT	ERLOCK								

1 EQ5020

HEAT WATER CIRC. PUMP C.V.

## Trane Air Conditioning Economics By: Trane Customer Direct Service Network EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4 HEAT RECOVERY

gà:	irane cust	tomer virec	t Servi	ce networ	`K									PAGE 74
."	PMENT ENER	RGY CONSUMP	TION - I	ALTERNATI	VE 4									
	ELEC	0.0	0.0	0.0	0.0	220 1.0	220 1.0	200 1.0	230 1.0	200 1.0	0.0	0.0	0.0	1,070 1.0
	EQ1000		PRI	EVENTS CO	OLING EN	FRGY								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	. 0
15.7	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	F05001		0111	*										
2	EQ5001 ELEC	0	CH. 0	O TLLED WAI	ER PUMP ( 0	C.V. 0	0	^	^	0	0		•	•
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0.0	0.0	0.0	0.0	0 0.0	0.0
. 2	EQ5010		COI	NDENSER W	ATER PUMI	O.V.								
	ELEC	0	0	0	0	÷ 0	0	0	0	0	0	0	0	0
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	9754	8825	10683	9290	10219	10219	9290	10683	9290	10219	9290	9290	117,051
	ÞΚ	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4
1	EQ4003		FC	CENTRIF.	FAN C.V.	•								
	ELEC	2276	2059	2493	2168	2384	2384	2163	2493	2168	2384	2168	2168	27,312
	PK	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
2	EQ4003		FC	CENTRIF.	FAN C.V.	•								
	ELEC	0	0	0	0	0	0	0	0	0	0.	0	0	0
	PX	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003		FC	CENTRIF.	FAN C.V.									
	ELEC	13975	12644	15305	13309	14640	14640	13309	15305	13309	14640	13309	13309	167,695
	PK	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5
	EQ4003				FAN C.V.									
	ÈLEC	1747						1664		1664				20,962
	PK	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
	EQ4003													
	ELEC	20030 95.4	18122		19076		20983				20983			240,355
	<b>γ</b> Λ	73.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
	EQ4003		FC	CENTRIF.	FAN C.V.									
44	ELEC	2504	2265		2384	2623			2742	2384	2623	2384		30,044
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
6	EQ4003		FC	CENTRIF.	FAN C.V.									1.7
	ELEC		18122		19076		20983			19076			° 19076	•
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
6	EQ4003				FAN C.V.									
	ELEC	2504	2265		2384	2623	2623	2384	2742	2384	2623	2384		•
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
1	EQ2101		PUF	RCHASED D	ISTRICT S	STEAM								
	P STEAM		1941		371	0	0	0	0	0	224	769	1741	8,600
	PK	11.1	11.1	10.8	8.0	0.0	0.0	0.0	0.0	0.0	7.9	10.0	10.9	11.1
1	505404		,,,,,	LT MAYES	0100 5111	40 0 11								

	ne Air Condi Trane Custo			e Network	ζ.									V 600 PAGE 75
	IPMENT ENERG Frecovery	Y CONSUMPI	「ION - AL	.TERNATI\	/E 4			•						
.*	ELEC	6264	5667	6294	2267	0	0	0	0	0	1909	3937	5966	32,304
	ÞΚ	29.8	29.8	29.8	29.8	0.0	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8
1	EQ5061		CONE	ENSATE F	RETURN PU	MP								
	ELEC	117	106	118	42	0	0	0	0	0	36	74	112	604
	PΚ	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
2	EQ2101		PURC	HASED DI	ISTRICT S	TEAM								
2	P STEAM	9931	9387	7248	1844	0	0	0	0	0	1083	3730	8418	41,641
	PK	53.6	53.6	52.3	38.9	0.0	0.0	0.0	0.0	0.0	38.3	48.3	52.9	53.6
2	EQ5020		HEAT	WATER C	CIRC. PUM	P C.V.								
	ELEC	5220	4723	5717	2386	- 0	0	0	0	0	2138	3778	4971	28,933
	PK	24.9	24.9	24.9	24.9	0.0	0.0	0.0	0.0	0.0	24.9	24.9	24.9	24.9
2	EQ5061		COND	ENSATE F	RETURN PU	MP								
	ELEC	26	23	28	12	0	0	0	0	0	11	19	25	143
	PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
3	EQ2000		PREV	'ENT SUM	OF HEAT	ENERGY								/
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PΚ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

# UTILITY PEAK CHECKSUMS - ALTERNATIVE 4 HEAT RECOVERY

- U T I	L	I	Ţ	Y	Р	Ε	Α	K	C	Н	E	C	K	S	U	M	S
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Utility	ELECTRIC	DEMAND
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Peak Value 1,068.1 (kW)
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

Eqp. Ref. Equ Num. Cod	ipment e Name	Equipme	ent Description	Utility Demand (kW)	Percnt Of Tot (%)	
Cooling Equipm	ent	•	-			
1	Q1001S 2-STG CTV	<555 TONS		310.7	29.09	
Sub Total				310.7	29.09	
Sub Total				0.0	0.00	
Air Moving Equ	ipment					
1 3 5 6	SUMMATION SUMMATION	OF FAN ELECTRIC OF FAN ELECTRIC OF FAN ELECTRIC	CAL DEMAND CAL DEMAND	57.3 74.9 107.3 107.3	7.01 10.05	
Sub Total				346.8	32.46	
Sub Total				0.0	0.00	
Miscellaneous						
Lights Base Utilitie Misc Equipmen Sub Total				0.0	38.45 0.00 0.00 38.45	
Grand Total				1,068.1	100.00	

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**************************
**************************
    TRACE 600
          ANALYSIS
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ENERGY SAVINGS OPPORTUNITY STUDY CARLISLE BARRACKS, PA DEPARTMENT OF THE ARMY BENATEC ASSOCIATES BUILDING 122

Weather File Code:

CARLISLE

Location:

ENERGY SAVINGS OPPORTUNITY STUDY

Latitude:

40.2 (deg)

Longitude: Time Zone: 77.2 (deg) 5

Elevation:

475 (ft)

Barometric Pressure:

29.2 (in. Hg)

Summer Clearness Number: Winter Clearness Number: Summer Design Dry Bulb: Summer Design Wet Bulb: Winter Design Dry Bulb:

Summer Ground Relectance:

72 (7) 4 (F)

92 (F)

Winter Ground Relectance:

0.20 0.20

1.00

1.00

Air Density:

0.0742 (Lbm/cuft)

Air Specific Heat:

0.2444 (Btu/lbm/F)

Density-Specific Heat Prod:

1.0882 (Btu-min./hr/cuft/F) 4,790.2 (Btu-min./hr/cuft)

Latent Heat Factor: Enthalpy Factor:

4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May

To September

System Simulation Period: January To December

Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run:

14:14: 6 2/2/94

Dataset Name:

CB122C .TM

AIRFLOW - ALTERNATIVE 1 COMBINED ECOS

(Design Airflow Quantities)

System Number	System Type	Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Main Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
1 7	TRH	10,853	36,175	36,175	36,175	10,853	0	0
2 5	5 <i>I</i>	0	1,450	104	1,450	, o	0	17,730
3 I	INDEP	5,830	19,435	19,435	33,612	20,008	25,306	0
4 (	JH	0	0	1,835	, O	0	0	Ö
5 0	DD	8,357	27,856	27,856	28,662	9,163	0	Ö
6 D	D	8,357	27,856	27,856	28,662	9,163	0	0
Totals		33,397	112,772	113,261	128,562	49,187	25,306	17.730

CAPACITY - ALTERNATIVE 1
COMBINED ECOS

Chesign Capacity Quantities)

System Number		Main Sys.	Capacity	Opt. Vent Capacity (Tons)		Main Sys. Capacity (Btuh)	Aux. Sys.	Preheat	Heating Reheat Capacity (8tuh)		Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
	TRH	64.2	0.0	0.0	64.2	-68,182	0	-630,301	0	0	0	-698,484
. 2	SZ	2.2	0.0	0.0	2.2	-8,951	0	0	0	0	0	-8.951
3	INDFP	45.0	70.5	0.0	115.5	-590,294	-1,033,467	0	0	0	0	-1,623,761
4	UH	0.0	0.0	0.0	0.0	-6,715	0	0	0	0	0	-6,715
	DD .	52.7	0.0	0.0	52.7	-208,290	0	-448,421	0	0	0	-656,711
6	$\tilde{D}\tilde{D}=1/44$	52.7	0.0	0.0	52.7	-208,290		•	0	a	0	-656,711
Totals	Page 100	216.8	70.5	0.0	287.3		-	-1,527,143	Ô	Ô	0	

The building peaked at hour 14 month 7 with a capacity of 216.8 tons

ENGINEERING CHECKS - ALTERNATIVE 1 COMBINED ECOS

			Percent		Coo	ling		Heat	ing	
System Number	Main/ Auxiliary	System Type	Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	8tuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	Floor Area Sq Ft
1	Main	TRH	30.00	0.63	563.3	896.2	13.39	0.63	-12.14	57,549
2	Main	SZ	0.00	0.35	651.8	1,842.8	6.51	0.03	-2.18	4,100
3	Main	INDFP	30.00	0.47	432.2	919.8	13.05	0.47	-14.27	41,364
3	Auxiliary	INDFP	0.00	0.61	359.0	586.7	20.45	0.61	-24.98	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	528.9	514.9	23.30	1.03	-24.21	27,121
6	Main	DD	30.00	1.03	-528.9	514.9	23.30	1.03	-24.21	27,121

System 1 Peak TRH - TERMINAL REHEAT

System	1	Peak	TRH	- TERMINAL	REHEAT							* 5	
											* q0*	Service of	, # 5 / /
******	<b>**</b> *****	(**** C(	DOLING COIL	PEAK *****	******	*******	***** CLG	SPACE	PEAK ****	***** HEA	TING COIL P	EAK *	*****
Peaked a	t Time ==	:>	Mo/Hr: 7	/14			* - Mo/	'Hr: 7	7/16 *		Mo/Hr: 13	/ i	*
Outside	Air ==>	1AO	DB/WB/HR: 9	1/ 74/105.0				ND8: 9				4	., 7
			, ,				*		*		01.551	1,237,1	
		Space	Ret. Air	Ret Air	Net	Percnt	* Sr	ace	Percnt *	Space Pe	ak Coil P	o a k	Percnt
Section 1		ens.+Lat.	Sensible	Latent	Total				Of Tot *				Of Tot
Envelope		(Btuh)	(Btuh)	(Btuh)	(Btuh)				(%) *				
Skylite		0	(00011)	(5001.)	0			0	0.00 *				(%)
Skylit		0	0		0			٨			0	. 0	0.00
Roof Co		٨	0		0			^	0.00 *		0	0	0.00
Glass		۸	0		-			0	0.00 *		0	V	0.00
		٥	•		0			0	0.00 *		0	0	0.00
Glass (		•	. 0		0			0	0.00 *		0	0	0.00
Wall Co		10.040	U		0			0	0.00 *		0	0	0.00
Partit		18,940			18,940		,		5.85 *	•		182	100.00
Expose		0			0			0	0.00 *		0	0	0.00
Infilt		0			0			0	0.00 *		0	0	0.00
Sub To		18,940	0		18,940		,	940	5.85 *	-68,1	82 -68,	182	100.00
Internal		A P W					*		*				
Lights		257,578	0		257,578				84.55 *		0	0	0.00
People		63,941			63,941		,	097	9.60 *		0	0	0.00
Misc		C	0	0	0		*	0	0.00 *		0	0	0.00
Sub Tot		321,519	0	0	321,519			978	94.15 *		0	0	0.00
Ceiling		0	0		0		*	0	0.00 *		0	0	0.00
Outside (		0	0	0	340,359		*	0	0.00 *		0	0	0.00
Sup. Fan					77,173	10.01	*		0.00 *			0	0.00
Ret. Fan			18,007		18,007	2.34	*		0.00 *			0	0.00
Duct Heat			0		0	0.00	*		0.00 *			0	0.00
OV/UNDR S	-	0			0	0.00	*	0	0.00 *		0	0	0.00
Exhaust			-5,402	0	-5,402	-0.70	*		0.00 *			0	0.00
[ Terminal	Bypass		0	0	0	0.00	*		0.00 *			0	0.00
y* y* .							*		*				
Grand Tot	tal==>	340,459	12,605	C	770,597	100.00	<b>*</b> 323,	917	100.00 *	-68,1	82 -68,	182	100.00
			C00L								AREAS		
			Sens Cap.	Coil Airfl	Enteri	ng DB/WB/H	R Leav	ing DB	/WB/HR	Gross Tot	al Glass	s (sf	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F De	g F Grain	s Deg F	Deg F	Grains		57,549	•	, , , <sub> </sub>
Main Clg	64.2	770.6	578.3	36,175	80.0 6	8.7 90.	2 64.8	62.5	83.4	Part	16,570		
Aux Clg	0.0	0.0	0.0	0	0.0	0.0 0.	0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0 0.	0.0	0.0	0.0	Roof	0		0 0
Totals	64.2	770.6								Wall	0		0 0
for we,													
	HEATIN	G COIL SELE	CTION		AI	RFLOWS (cf	m)	E	NGINEERING	CHECKS	TEMPERA	TURES	(F)
***	Capacit	y Coil Ai	rfl Ent	Lvg	Type	Cooling	Heating	Clg	% OA	30.0	Type	Clg	Htg
2 10	(Mbh)	(cfm	ı) Deg F			10,853	. 0	Clg	Cfm/Sqft	0.63	SAD8	66.8	-
Main Htg	-68.	2 36,1	.75 68.0	69.7	Infil	. 0	0	-	Cfm/Ton	563.33	Plenum	75.0	
Aux Htg	0.	0	0.0		Supply	36,175	36,175		Sqft/Ton		Return	75.5	
Preheat	-630.	3 36,1	.75 48.8			36,175	, 0		Btuh/Sqft		Ret/OA	80.0	
Reheat	-0.	0	0.0		Return		36,175	-	People		Runarnd	75.0	
Humidif	0.	0	0.0		Exhaust	10,853	0		% OA		Fn MtrID	0.5	
Opt Vent	0.	0	0.0		Rm Exh	0	0		Cfm/SqFt		Fn 8ldTD	0.4	
Total	-698.				Auxil	0	0	_	Btuh/SqFt		Fn Frict	1.1	
								,	, - 1 -	-	•	•	

			ioning Econ er Direct S	Service Netwo	ork									V 600 Page	5
System	n	2	Peak	SZ	- SINGLE	ZONE								andra Maria	
****				200 1110 001	ጠዋል <i>ሁ</i> ሁቀቀቀቀ	***	***		****	20125	CCAL distribution			) p	44 400
		:- Time		Mo/Hr:		*****	****			SPACE  Hr:		****** HEAT]	NG COIL PEA Mo/Hr: 13/	16. A 17	***
Outsid				D8/W8/HR: 9		0				ADB:	•		0ADB: 4	1 4	Á
000010			0.1	י און ניטוון ניטווין טעווי	,1, 10, ,0.	v			*	. טעה	*		UNDO. 4		
			Space	Ret. Air	Ret. Air	N	et P	ercnt	* S	pace	Percnt *	Space Peak	* * * * *	k Per	cnt
		5	Sens.+Lat.	Sensible	Latent	Tota		f Tot		ible	Of Tot *				1.0
Envelo			(Btuh)	(Btuh)	(Btuh)	(Btu	h)	(%)	<b>*</b> (8	tuh)	(%) *	(Btuh)	(8tu		(\$)
		Solr	0	0			0	0.00		0	0.00 *	(	)	0 0	.0(
		Cond	0	0			0	0.00		0	0.00 *	(	)		.00
Roof			0	860			60	3.22		0	0.00 *	C	-2,55		.46
Glas			255	0			55	0.96		255	1.05 *	(			.00
Glas			162	0			62	0.61		162	0.67 *	-766			.40
Wall Part			747 0	183		9.	29	3.48		747	3.06 *	•			.14
		Floor	0			-	0	0.00		0	0.00 * 0.00 *		)		.00
		tion	0				0	0.00		0	0.00 *		1		).00
		1==>	-1,164	1,042		2,2	•	8.26		,164	4.77 *		-6,17		
Intern			-,	-, - , -		-,-	• •		*	, 20.	*	0,001		_ 100	. • •
Ligh			19,780	0		19,7	80	74.09	<b>*</b> 19	,780	81.07 *	(	)	0 0	.00
Peop	ole		4,712			4,7		17.65		,223	9.11 *	Ċ	)	0 = 0	
Misc	:		0	0	0		0	0.00	<b>*</b>	0	0.00 *	C	)	/	.00
		11==>	24,492	0	0	24,4	92	91.74	<b>*</b> 22	,002	90.18 *	0	)	0 0	.00
Ceilin	-		1,918	-1,918			0	0.00		,233	5.05 *	-,,	)	0 0	00.
Outsid			0	0	0		0	0.00		0	0.00 *		)		.00
Sup. F							0	0.00			0.00 *				00.(
Ret. F				0			0	0.00			0.00 *				00.0
Duct H			0	0			0	0.00		0	0.00 *				00.0
Exhaus			V	0	0		0	0.00		U	0.00 * 0.00 *	(	}		00.0
Termin				0	0		0	0.00			0.00 *				).00 ).00
I CI OCT (	141 (	, y pa 3 3		V	V		V	0.50	*		V.00 *			0 0	.00
Grand	Tota	1==>	27,574	-876	0	26,6	98 1	00.00	* 24	, 399	100.00 *	-6,481	-6,17	2 100	.00
				C00l	THE COTE C	CLECTION							40545		
		Total	Canacity	Sens Can	Coil Airfl	ECCUITUNT: Ente:	rina	UB/MB/H	R 102	vina N	2/WR/HO	Grace Tatal	KEAS	(sf) (	
		(Tons)	(Mbh)	(Mbh)	(cfm)	Deo F	.∡∷y ' Dea F	Grain	Dea F	Dea F	Grains	Gross Total Floor 4	,100	(21) (	6)
Main Cl				24.2						56.8		Part	0		
		0.0		0.0						0.0		ExFlr			
		0.0	0.0							0.0	0.0	Roof		0	0
Totals		2.2	26.7									Wall	196	21	11
				ECTION					m)		NGINEERING		TEMPERATU	IRES (F)	
		•	-	irfl Ent				-	Heating		3 % OA			-	itg
		(Mbh)	-		Deg F	Vent			0		Cfm/Sqft			9.5 12	
Main Ht	-	-9.			125.0				0		Cfm/Ton				3.8
Aux Ht	-	0.			0.0				104		Sqft/Ton				4.5
Preheat Dabaat		-0.	•		59.5			0	0		Btuh/Sqft				4.5
Reheat Humidif		0.			0.0 0.0	Return Exhaust			104		People				8.0
Humidif Opt Ven		0. 0.			0.0	Rm Exh		0 0.7.7.7.0	0		g % OA g Cfm/SqFt		Fn MtrTD		0.0
upt ven Total		-9.		0.0	٧.٧	Auxil		1,730	0		; c:m/sqrt ; Btuh/Sqft		Fn BldTD Fn Frict		0.0
ocal		-7.	v			UNVII		V	U	urí	y oranyour t	2.10	rn ittit	0.0	ν.

System 3 Block INDFP - 4-PIPE INDUCTION

													*.
1.0		***** CO(			*********	*******				***** HEAT			k****
Peaked at			Mo/Hr: 7	•			* Mo,	/Hr: 7	1/20 *		Mo/Hr: 13/	1	
Outside A	ir ==>	OAD	3/W8/HR: 9	74/105.0	)		* 04	4D8: 8	33 *		OAD8: 4	<b>‡</b>	
Captor .							*		*				• •
ing in the second of the secon		Space	Ret. Air	Ret. Air	Net	Percnt	* S	pace	Percnt *	Space Pea	k Coil Pe	eak Pe	eront
	Sens	s.+Lat.	Sensible	Latent	Total	Of Tot	* Sens:	ible	Of Tot *	Space Sen	s Tot Se	ens Of	f Tot
Envelope l	Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	* (B	tuh)	(%) *	(Btuh	) (Btu	ıh)	(%)
Skylite	Solr	0	0		0	0.00	*	0	0.00 *	1	)	0	0.00
Skylite		0	0		0	0.00	*	0	0.00 *	1	)	0	0.00
Roof Cor	nd	474	21,484		21,957	1.49	*	740	0.16 *	-1,57	9 -73,4	146	4.52
Glass So	olar	77,250	0		77,250	5.26	* 70	,438	15.09 *				0.00
Glass Co	ond	36,551	0		36,551			,143	5.17 *	-185,61	9 -185,6		11.43
Wall Cor			16,902		130,232			,726	37.00 *	•	•		23.24
Partitio		0	,		0			0	0.00 *		•		0.00
Exposed		0			0			0			)		0.00
Infiltra		613,478			613,478			,432		-987.37	7 -987,3		60.81
Sub Tota			38,386		879,468			,477			1 -1,623,7		00.00
Internal t		,	20,000		5.7,100	37131	*	,	*	1,001,70	- 1,010,		
Lights		179,324	0		179,324	12,20	* 48	,699	10.43 *		0	0	0.00
-	·		·		45,248			,	1.15 *		0		0.00
Misc		0	0	0	0			0	0.00 *		0	0	0.00
Sub Tota	al==> 2	224,572	0	0	224,572			,053	11.58 *		0	0	0.00
Ceiling Lo			-14,654	•	0			,171	5.39 *	-47,81	- 1	0	0.00
Outside Ai			0	0	252,299			0	0.00 *	,	0	-	0.00
Sup. Fan l		•	•	•	110,564			•	0.00 *		•	0	0.00
Ret. Fan H			13,820		13,820				0.00 *			Ô	0.00
Duct Heat			0		0				0.00 *			0	0.00
OV/UNDR SE		122	•		122			122	0.03 *		0	0	0.00
Exhaust He		***	-11,266	0					0.00 *		•	0	0.00
Terminal (			0		0				0.00 *			0	0.00
. 10/11/101	J, pu 33		·	·	·	<b>V.</b> 00	*		*			v	۷.۷۷
Grand Tota	al::> 1.0	080.430	26.287	0	1.469.580	100 00	* 466	.824	100 00 *	-1,550,79	2 -1 623 1	761 10	00 00
		,	20,20.	•	1, 107, 550	1,0,0	,,,,	,	100100	1,330,77	1,020,		
			coot	ING COIL SI	ELECTION						ARFAS		
							HR <b>Le</b> a			Gross Tota		s (sf)	(%)
and the state of t	(Tons)			(cfm)				-	Grains		1,364	3 (3/)	`
Main Clg	45.0	539.6	385.7	19,435	80.9 60			-	70.1	Part	0		· 5
-		846.0					.4 65.7				Ö		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	.0 0.0	0.0		Roof 1		0	0
Totals	115.5	1.385.6		-					• • •	Wall 2	8 354		
, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		.,								nuii L	0,031	J,132	•
	HEATING (	COTI SELEC	CTION		AI	RELOWS (c	fm)	1	ENGINEERING	CHECKS	TEMPERAT	TURES (	F)
							Heating		g % OA		Туре		Htg
			) Deg F	Deg F	Vent	5.830	0	Clo	g Cfm/Sqft		SADB	-	
Main Htg	-590.3	19 4	35 64.5	92.4	Infil	14.177	0 14,177	616	g Cfm/Ton		Plenum	76.1	64.4
Aux Htg	-1.033.5	25 3	06 68.1	105.6	Supply	19.435	19,435	016	g Sqft/Ton		Return	76.8	64.5
Preheat		19,4			Mincfm	0	0	016	g 8tuh/Sqft		Ret/OA	80.9	64.5
Reheat	0.0				Return	19.435	19,435		. Paople		Runarnd	75.0	68.0
Humidif	0.0		0 0.0	0.0		5,830	0		g % OA	0 0	Fn MtrTD	1.3	1.3
Opt Vent	0.0		0 0.0		Rm Exh	0,000	ő	Ht	g Čfm/SqFt	0.47	Fn BldTD	1.0	1.0
	-1,623.8			-,-	Auxil	25.306	25,306		g Btuh/SqFt		Fn Frict		2.9
10041	1,020.0					23,000	23,000	11.6	a prompodit	17.41	. 11 1 1 1 1 1 1 1 1	٤.,	/

System 4 Block UH - UNIT HEATERS

******	******	****** C(	OOLING COIL	PEAK ****	*******	******	*****	**** CLG	SPACE	PEAK ****	***** HEAT	TNG COTT PE	ΔK *	*****
Peaked a	t Time ==	<b>&gt;</b> "	Mo/Hr: (	)/ 0			*		/Hr: (			Mo/Hr: 13/		
Outside (	Air ==>	DAC	DB/WB/HR:	0/ 0/ 0.	0		*		ADB:	0 *		OADB: 4		1
							*			*		4 4	erani. Parangan	4.00
,		Space	Ret. Air	Ret. Air	Ne	et Per	cnt *	S	pace	Percnt *	Space Pea	k Coil Pe	ak	Percnt
	S	ens.+Lat.	Sensible	Latent	Tota	al Of	Tot *	Sens	ible	Of Tot *				Of Tot
Envelope		(Btuh)	(Btuh)	(Btuh)	(Btul	h)	(%) *	(8	tuh)	(%) *	(Btuh			(%)
Skylite		0	0			0 0	.00 *		0	0.00 *		0	Ó	0.00
Skylit		0	0			0 0	.00 *		0	0.00 *		0	0	0.00
Roof Co		0	0			0 0	.00 *		0	0.00 *		0	0	0.00
Glass		0	0			0 0	.00 *		0	0.00 *		0	0	0.00
Glass		0	0			0 0	.00.		0	0.00 *		0	0	0.00
Wall Co		0	0			0 0	.00 *		0	0.00 *		0	0	0.00
Partit		0			. –	0 0	.00 *		0	0.00 *	-6,71	5 -6,7	15	100.00
	d Floor	0				0 0	.00 *		0	0.00 *		0	0	0.00
Infilt		0				0 0	.00 *		0	0.00 *		0	0	0.00
Sub To		0	0			0 0	.00.		0	0.00 *	-6,71	5 -6,7	15	100.00
Internal							*			*	•	·		
Lights		0	0			0 0	* 00.		0	0.00 *		0	0	0.00
People		0				0 0	.00 *		0	0.00 *		0	0	0.00
Misc		0	0	0		0 0	* 00.		0	0.00 *		0	0	0.00
Sub Tot		0	0	0		0 0	.00 *		0	0.00 *		0 -	0	0.00
Ceiling (		0	0			0 0	.00 *		0	0.00 *		0	.0	0.00
Outside A		0	0	0		0 0	.00 *		0	0.00 *		0	0	0.00
Sup. Fan							.00 *			0.00 *			0	0.00
📜 Ret. Fan			0				.00 *			0.00 *			0	0.00
Duct Heat			0				.00 *			0.00 *			0	0.00
OV/UNDR S	-	0				0 0	.00 *		0	0.00 *		0	0	0.00
Exhaust H			0	0			.00 *			0.00 *			0	0.00
. Terminal	Bypass		0	0		0 0	.00 *			0.00 *			0	0.00
A							*			*				
Grand Tot	tal==>	0	0	0		0 0	.00 *		0	0.00 *	-6,71	5 -6,7	15	100.00
			C00L	THE COTE OF	"! COTTON									
			Sens Cap.								Cuasa 7-1-	AREAS		` (^)
	(Tons)	(Mbh)	(Mbh)	(cfm)		ring DB				WB/HR	Gross Tota		(ST	) (%)
Main Clg	0.0	0.0	0.0	(CIM) 0	Deg F D	0.0	0.0	0.0	0.0	Grains 0.0		2,544		
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part Exflr	1,632		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	0		, ,
Totals	0.0	0.0	0.0	V	V.V	V.V	0.0	۷.۷	v.v	0.0	Wall	0		0 0
		-,,									Mall	V		0 0
			CTION		A	AIRFLOW	S (cfm)		E	NGINEERING	CHECKS	TEMPERAT	URES	(F)
		/ Coil Ai			Type	Cool	-	Heating		1 % DA	0.0	Type	Clg	Htg
	(Mbh)	•		Deg F	Vent		0	. 0	Clg	Cfm/Sqft	0.00	SADB	0.0	71.4
Main Htg	-6.7			71.4	Infil		0	0		Cfm/Ton	0.00	Plenum	0.0	
Aux Htg	0.0		0.0	0.0	Supply		0	1,835	-	Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0		0.0	0.0	Mincfm		0	0		Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Reheat	0.0		0.0	0.0	Return		0	1,835		People	0	Runarnd	0.0	68.0
Humidif	0.0		0.0	0.0	Exhaust		0	0		% OA	0.0	Fn MtrID	0.0	0.0
Opt Vent	0.0		0.0	0.0	Rm Exh		0	0	_	Cfm/SqFt	0.72	Fn BldTD	0.0	0.0
Total	-6.7	1			Auxil		0	0	Htg	Btuh/SqFt	-2.64	Fn Frict	0.1	0.0

System 5 Block DD - DOUBLE DUCT

A Array												•
2.5					*********	*******	****** CLG			****** HEATI		<b>I</b>
Peaked a	t Time ==>		Mo/Hr:	7/14	_		* Mo,				Mo/Hr: 13/	<b>I</b>
		OAL	)B/WB/HR:	91/ 74/105.0	)		* 0/	ADB: 9	1 *		OAD8: 4	
		0	5 1 42	5.1 4.2	n - 1		*		*			
1		Space		Ret. Air	Net	Percht	* 5			Space Peak		<b>I</b>
		ns.+Lat.			Total			ble		,		
	Loads	(Btun)	(Btuh)	(Btun)					(%) *	(Btuh)	(Btu	
Skylite	e Solr	0	0		0	0.00	¥	0	0.00 *			
Skylite	e cona	0	0 0 0		0			0	0.00 *			0 0.00
	ona o-1	14,486	0		14,486			,221	8.17 *	-48,286	-48,2	I
	Solar	8,014	U		8,014				3.64 *			
		3,286	0		3,286				1.77 *		-16,5	I
Wall Co		4,161	526		4,687		* 5,	,622	2.83 *	-16,6//	-18,9	
Partit:		0			0	0.00	*	0	0.00 *			0 0.00
	d Floor	0			0			0	0.00 *			
		24,070			24,070					-56,169		I
		54,017	526		54,543			,1/6	23.25 *	•	-139,9	64 73.75
Internal		107 010	^		107 010	10.47		705	<b>*</b>	•		
		123,012				19.46			65.32 *			0 0.00
People		30,203		۸	•	4.78			7.36 *			0.00
Misc Sub Tai	+ a ) = = \	0				0.00		0	0.00 *			0 0.00
500 101	(al==)	153,215	1 775	.0	153,215				72.68 *			0 0.00
Celling (	LOad	1,3/5	-1,375	۸		0.00		,555	0.78 *	,		0 0.00
Outside #		0	0	0		39.46	* *	0	0.00 *			0 0.00
Sup. Fan Ret. Fan			10 000			25.07			0.00 *			0 0.00
Duct Hea			19,809		19,809	0.00			0.00 * 0.00 *			0 0.00
		6,537	0			1.03		,537	3.29 *		-49,8	0 0.00   20 26.25
Exhaust 1		0,357	-0 07/	٨	-9,934			, 101	0.00 *		-47,0	0 0.00
	Bypass		-9,934 0	0					0.00 *			0 0.00
TOTALINAT	bypass		V	V	v	-0.00	*		*			0.00
Grand To	tal::>	215.144	9.026	0	632.052	100.00	* 198	.603	100.00 *	-192,167	-189 7	84 100 00
		,	,,,,	-	,		-7-	,		272,207	107,1	
			coo	LING COIL SI	ELECTION						AREAS	
	Total C	apacity	Sens Cap.	Coil Airfl	Enteria	ng DB/WB/H	lR Leav	∕ing DB	/W8/HR	Gross Total	Glass	(sf) (%)
					Deg F Deg					Floor 27		, , ,
Main Clg	52.7	632.1	496.7	27,856	80.4 69	9.1 91.	7 63.2	62.6	86.1	Part	0	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0 0.	0.0	0.0	0.0	Exflr	0	
		0.0	0.0	0	0.0	).0 0.	0.0	0.0	0.0	Roof 8	,563	0 0
Totals	52.7	632.1								Wall 1	,613	460 29
er er er er er er er er er er er er er e	•											
					AIF		a)		NGINEERING	CHECKS	TEMPERAT	URES (F)
	Capacity			-			Heating	-	1 % OA			Clg Htg
	(Mbh)	(cfn		_	Vent		0	_	Cfm/Sqft		SADB	68.4 74.3
Main Htg	-208.3	•			Infil		807		Cfm/Ton			75.4 66.5
Aux Htg	0.0		0 0.0		Supply		27,856	_	Sqft/Ton			76.1 67.5
Preheat	-448.4	· · · · · · · · · · · · · · · · · · ·				0	0	_	Btuh/Sqft			80.4 67.5
	0.0		0 0.0		Return	,	27,856					75.0 68.0
Humidif	0.0		0 0.0			8,357	0		1 % OA		Fn MtrTD	1.3 1.3
Opt Vent	0.0		0 0.0	0.0	Rm Exh	0	0		Cfm/SqFt			1.0 1.0
Total	-656.7				Auxil	0	0	Htg	Btuh/SqFt	-24.21	Fn Frict	2.9 2.9

System 6 Block DD - DOUBLE DUCT

*************** Peaked at Tim	יייייייייייייייייייייייייייייייייייייי	Mo/Hr:	7/1/										*****
Outside Air =						*		/Hr:		<b>*</b> •	Mo/Hr: 13	•	,
- COURT OF ALL CO	- /	OUDD! HE! HE!!	/1/ /4/103.	V		*	U	HU0:	91	‡ *	CADB:	4	
	Spac	e Ret. Ai	r Ret. Air	1	let Percr	nt *	S	nace	Percnt	≮ Space Pea	k Coil f	Dask	Percn
	Sens.+Lat				al Of To		Sens:		Of Tot	•			Of To
Envelope Loads				(8t)			(8:		(%)	•			U) (U
Skylite Sol			1	· ·	, ,	0 *	•	0	0.00	•	0	, un ) ()	0.0
Skylite Con		0				00 *		0	0.00		0	0	0.0
Roof Cond	14,48	6	0	14,4		9 *		,221	8.17		6 -48,	•	25.4
Glass Solar			0	8,0		27 *		,222	3.64	,			0.0
Glass Cond	3,28	6	0	3,2		2 *		,509	1.77		8 -16,		8.7
Wall Cond	4,16	1 52	6	4,6		4 *		,622	2.83	•	7 -18,		9.9
Partition				7.	0 0.0	0 *		0	0.00		•		0.0
Exposed Floo	or	0			0 0.0	10 *		0	0.00		0	0	0.0
Infiltration		0		24,0	70 3.8	1 *	13.	,603	6.85			-	29.6
Sub Total==:		7 52	6	54,5		3 *		,176					73.7
Internal Loads	3			•		*			*	,,,,	/,		
	123,01		0	123,0	12 19.4	6 *	129,	,725	65.32	(	0	0	0.0
People	30,20	3		30,2	03 4.7	8 ¥	14,		7.36		0	Ō	0.0
Misc		=	0 0		0 0.0	0 *		0	0.00	(	0	0	0.0
Sub Total==:			0 0	153,2	15 24.2	4 *	144,	, 337	72.68	:	0	0	0.0
Ceiling Load		,			0 0.0	0 *	1,	,553	0.78	-4,62	7	0	0.0
Dutside Air		0 (	0	249,4		6 *		0	0.00	:	0	0	0.0
Sup. Fan Heat				158,4		7 *			0.00	:		0	0.0
Ret. Fan Heat		19,80		19,8		3 *			0.00	:		0	0.0
Duct Heat Pkup		_	)		0 0.0				0.00			0	0.0
DV/UNDR Sizing	6,53	/			37 1.0		6,	537	3.29 *	. ,	0 -49,	820	26.2
Exhaust Heat		-9,93		-9,9		7 *			0.00			0	0.0
<b>Termin</b> al Bypas	55	(	0		0 -0.0	0 *			0.00 *			0	0.0
Grand Total==>	215 14.	1 0 02	۸ (	472 A	52 100 0	. ¥ ∧ +	100	(07	100 00 4		7 400		
Alama Tobus>	213,17	1 7,020	, <b>v</b>	632,0	JZ 100.0	V *	170,	003	100.00 +	-192,16	/ -189,	/84	100.0
		co	DLING COIL S	ELECTION-							ARFAS		
Tot	al Capacity	Sens Cap.	Coil Airfl	Ente	ring DB/W	B/HR	Leav	ina DI	B/W8/HR	Gross Tota			) (%)
(Ton	is) (Mbh)	(Mbh)	(cfm)	Deg F	Deg F Gr	ains	Deg F	Deg F	Grains	Floor 2		5 (31	) (0)
ain Clg 52	.7 632.				69.1	91.7	63.2	62.6		Part	0		
ux Clg 0	.0 0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
	.0 0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0		8,563		0
	.7 632.	l									1,613	4	60 2
	<b>W</b>												
		LECTION			AIRFLOWS				ENGINEERING	CHECKS	TEMPERA	TURES	(F)
-	city Coil			Type	Coolin	-	Heating	-	j % OA	30.0	Type	Clg	Htg
		fm) Deg F	_	Vent	8,35		0		g Cfm/Sqft	1.03	SADB	68.4	
_		,856 67.5		Infil	80		807		g Cfm/Ton	528.87	Plenum	75.4	
ıx Htg	0.0	0 0.0		Supply	27,85		27,856		sqft/Ton	514.91	Return	76.1	
		',856 48.4		Mincfm			0		Btuh/Sqft		Ret/OA	80.4	67.
eheat 	0.0	0 0.0		Return	27,85		27,856		. People	65	Runarnd	75.0	
umidif	0.0	0 0.0		Exhaust	8,35		0		% 0A	0.0	Fn MtrID	1.3	1.
ot Vent	0.0	0.0	0.0	Rm Exh		)	0		Cfm/SqFt		Fn BldTD	1.0	1.0
otal -6	56.7			Auxil		0	0		a Btuh/SqFt	-24.21	Fn Frict	2.9	2.9

BUILDING U-VALUES - ALTERNATIVE 1 COMBINED ECOS

BUILDING U-VALUES

		Room U-Values(8tu/hr/sqft/F)										Room
Onan				Cummn		/111/541		Minto			Mass	Capac.
Room	Dannistian	0	C., C1	Summr	Wintr	0	Summr	Wintr	W 12	0	(1b/	(8tu/
Number	Description	Part.	ExFlr	Skylt	Skylt	коот	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	29.4	5.93
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	<pre>11 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.229	0.000	103.3	21.63
Zone	<pre>3 Total/Ave.</pre>	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.229	0.000	103.3	21.63
: 5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	102.3	21.84
12	·	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.229	0.000	146.4	31.13
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.229	0.000	146.4	31.13
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.256	0.317	74.1	15.63
13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	13 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	27.0	5.41
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.000	71.5	15.21
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	32.5	6.60
Zone	14 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550		0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550		0.257	0.000	27.0	5.41
Zone	15 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	71.5	15.21
Zone	16 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	43.1	8.94
Buildin		0.229	0.000	0.000			0.550	0.563	0.256	0.317	52.6	10.93
eartain	13	0.447	0.000	0.000	0.000	0.088	0.330	A.707	V.2J0	0.317	34.0	10.73

BUILDING AREAS - ALTERNATIVE 1 COMBINED ECOS

------ BUILDING AREAS -----

										• .		* Mid	
				Floor	Total		Exposed					Ž.	1.1
		Numbe	er of	Area/Dupl		Partition	Floor	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room		Dupl	icate	Room	Area	Area	Area	Area	/Rf	Area	Area	/W1	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	SUB BSMT, BSMT W	1	1	45,125	45,125	13,222	0	0	0	0	0	0	0
Zone					45,125	13,222	0	0	0	0	0	0	0
4	BSMT E	1	1	12,424	12,424	3,348	0	0	0	0	0	0	. 0
Zone	4 Total/Ave.				12,424	3,348	0	0	0	0	0	0.	0
System	<pre>1 Total/Ave.</pre>				57,549	16,570	0	0	0	0	0	0	0
2	TOILETS, KITCHEN	1	1	3,520	3,520	0	0	0	0	0	21	11	174
Zone	2 Total/Ave.		•		3,520	0	0	0	0	0	21	11	174
11	TOILETS W ROOF	1	1	580	580	0	0	0	0	580	0	0	0
Zone	11 Total/Ave.				580	0	0	0	0	580	0	0	0
System	<pre>2 Total/Ave.</pre>				4,100	0	0	0	0	580	21	11	174
3	STAIRS	1	1	560	560	0	0	0	0	0	255	29	625
Zone	3 Total/Ave.				560	0	0	0	0	0	255	29	625
5	1ST FL OFFICES	1	1	11,724	11,724	0	0	0	0	0	1,573	19	6,530
Zone	5 Total/Ave.				11,724	0	0	0	0	0	1,573	19	6,530
7	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	0	0	1,610	17	7,730
Zone	7 Total/Ave.				14,400	0	0	0	0	0	1,610	17	7,730
9	3RD FL OFFICES	1	1	14,400	14,400	0	0	0	0	14,400	1,610	17	8,010
Zone	9 Total/Ave.				14,400	0	0	0	0	14,400	1,610	17	8,010
12	STAIRS W ROOF	1	1	230	280	0	0	0	0	280	105	25	307
Zone	•				230	9	0	0	0	280	105	25	307
System	· ·				41,364	0	0	0	0	14,680	5,152	18	23,202
	SUPPLY STORAGE		1	2,544	2,544	1,632	0	0	0	0	0	0	0
	13 Total/Ave.				2,544	1,632	0	0	0	0	0	0	0
System					2,544	1,632	0	0	0	0	0	0	0
6	1ST FL CEN OFFCS	1	1	9,884	9,384	C	0	0	0	0	250	19	1,038
Zone					9,384	0	0	0	0	0	250	19	1,038
	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	55
Zone	8 Total/Ave.				8,674	0	0	0	0	0	105	66	55
	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
	<pre>10 Total/Ave.</pre>				8,563	0	0	0	0	8,563	105	64	60
System					27,121	0	0	0	0	8,563	460	29	1,153
14		1	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	<pre>14 Total/Ave.</pre>				9,884	0	0	0	0	0	250	19	1,038
15		1	1	8,674	8,674	0	0	0	0	0	105	66	<b>5</b> 5
Zone	<pre>15 Total/Ave.</pre>				8,674	0	0	0	0	0	105	<b>6</b> 6	<b>5</b> 5
16		1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	<pre>16 Total/Ave.</pre>				8,563	0	0	0	0	8,563	105	64	60
System					27,121	0	0	0	0	8,563	460	29	1,153
Buildi	ng ·				159,799	18,202	0	0	0	32,386	6,095	19	25,681

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ASHRAE 90 ANALYSIS - ALTERNATIVE 1 COMBINED ECOS

----- ASHRAE 90 ANALYSIS-----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.313 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.199 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft) Wall Overall Thermal Transfer Value (OTTVw) = 15.07 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1 COMBINED ECOS

#### System Totals

Percent	cent Cooling Load			Heatir	ng Load		Cooling	Airflow		Heating Airflow				
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours		
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)			
0 - 5	14.4	0	0	-182,567	13	173	5,730.4	0	0	0.0	0	0		
5 - 10	28.7	1	12	-365,133	6	78	11,460.7	0	0	0.0	0	0		
10 - 15	43.1	7	70	-547,700	~ 6	78	17,191.1	0	0	0.0	0	.0		
15 - 20	57.5	9	98	-730,267	4	59	22,921.4	0	0	0.0	0	0		
20 - 25	71.8	7	72	-912,833	4	48	28,651.8	0	0	0.0	0	0		
25 - 30	86.2	9	93	-1,095,400	7	94	34,382.1	0	0	0.0	0	0		
30 - 35	100.5	21	226	-1,277,966	10	139	40,112.5	0	0	0.0	0	0		
35 - 40	114.9	9	100	-1,460,533	11	147	45,842.8	0	0	0.0	0	0		
40 - 45	129.3	8	86	-1,643,100	40	541	51,573.2	0	0	0.0	0	0		
45 - 50	143.6	5	49	-1,825,667	0	0	57,303.6	0	0	0.0	0	0		
50 - 55	158.0	4	45	-2,008.233	0	0	63,033.9	0	0	0.0	0	0		
55 - 60	172.4	2	19	-2,190,800	0	0	68,764.3	0	0	0.0	0	0		
60 - 65	186.7	7	70	-2,373,366	0	0	74,494.6	0	0	0.0	0	0		
65 - 70	201.1	6	60	-2,555,933	0	0	80,225.0	0	0	0.0	0	0		
70 - 75	215.4	6	50	<b>-2,738,500</b>	0	0	85,955.3	0	0	0.0	0	0		
75 - 80	229.8	0	5	-2,921,067	0	0	91,685.7	0	0	0.0	0	0		
' <b>80 -</b> 85	244.2	0	5	-3,103,633	0	0	97,416.0	0	0	0.0	0	0		
85 - 90	258.5	0	0	-3,286,200	0	0	103,146.4	0	0	0.0	0	0		
5 <b>90 -</b> 95	272.9	0	0	-3,468,767	0	0	108,876.8	0	0	0.0	0	0		
95 - 100	287.3	0	0	-3,651,333	0	0	114,607.1	100	2,520	0.0	0	0		
Hours Off	0.0	0	7,690	0	0	7,403	0.0	0	6,240	0.0	0	8,760		

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1 COMBINED ECOS

<u> </u>					RUT	LDI	N G	TEM	PFR	4 T II	R F P	RNF	7   5	9			
Temperature												• .	1	v			
Range (F)	1	4	2	11	3	5	7			Zone N 13		8	10	14	15	16	
Max. Temp.	78.3	78.0	163.5	108.9	84.0	83.5	83.4	82.0	83.4	90.1	84.3	84.8	83.9	84.3	84.8	83.9	
Mo./Hr.					7 23	7 24		7 21				10 24				7 6	
Day Typa	5	5	2	2	1	1	1	4	4	2	5	1	5	5	1	5	
									<b>N</b> UH	mber o	f Hour	5					
Above 100	0	0	7,065	2,636	0	0	- 0	0			0		0	0	0	0	
95 - 100	0			169			0	0			0	-	-	-	0	0	
90 - 95	0	0		1,266						76	0	-	0		0	•	
85 90	0			156		0	0	0	0	1,831	0	0	0	0	0	0	
80 - 85	0	0	241	1,183	693			363		1,473	1.217	1.377	877	1.217	1,377	877	
75 - 80	3,672	1,623	486	278	1,973								3,314				
70 - 75	2,103	4,132		784												1,386	
65 - 70	1,865	1,688	0	800				1,545					2,146			2,146	
60 - 65	1,120	1,293						1,368					668	870			
55 - 60	0	24	0	142	1,058	1,043	1,049	975	1,041	110	363	0	369	363	0	369	
50 - 55	0	. 0	0	0	738	653	640	545	681	0	434	0	0	434	0	0	
Below 50	0	0	0	0	965	868	861	638	<b>8</b> 80	0	6	0	0	6	0	0	
Min. Temp.	60.8	59.4	67.9	58.1	33.8	34.8	34.9	37.7	35.6	59.2	49.8	65.7	56.5	49.8	65.7	56.5	
Mo./Hr.	2 8		1 6		2 7	2 7	2 7	2 7	2 7	2 7	2 7	2 11	2 7	2 7	2 11		
Day Type	5	5	1	5	5	5	5	5	5	5	5	5	5	5	5	5	

All Company

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1 COMBINED ECOS

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	STEAM On Peak (Therm)	WATER (1000 Gl)	STEAM DMND On Peak (Thrm/hr)
Jan	135,416	667	11,246	0	55
Feb	122,519	667	10,411	0	55
March	148,313	667	9,724	0	55
April	123,931	667	2,842	0	43
May	160,025	778	0	57	0
June	164,813	823	0	91	0
July	161,875	874	0	149	0
Aug	173,409	834	0	101	0
Sept	145,893	794	0	55	0
0ct	134,870	667	1,822	0	40
Nov	127,109	667	4,967	0	52
Dec	128,968	667	9,808	0	55
Total	1,727,141	874	50,822	454	55

Building Energy Consumption = 68,692 (8tu/Sq Ft/Year)
Source Energy Consumption = 153,081 (8tu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1 COMBINED ECOS

----- EQUIPMENT ENERGY CONSUMPTION------

														• .
	Equip	********				Mon	thly Con	sumption						
Num	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS													
	ELEC	50971	46117	55825	48544	53398	53398	48544	55825	48544	53398	48544	48544	611,651
8 g 2 f	ÞK	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3
3⊶1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	. 0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
M.	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
Sp.	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	· PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41.1	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
3.7 6.3	P HOTH20	0	0	0	0	0	0	0	0	0	0	0	0	0
	ÞK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	. 0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
•	EQ1001S		261	IG CTV <5	EE TONO									
	ELEC	0	0	0	פאטו ככנ	11882	16670	27199	18532	11218	0	0	0	85,501
	PK	0.0	0.0	0.0	0.0	81.7	127.2	177.8	137.7	98.3	0.0	0.0	0.0	177.8
1	EQ5100		coni	ING TOWE	: p									
	ELEC	0	0	0		5115	5115	4650	5348	4650	0	0	0	24,878
	PK	0.0	0.0	0.0	0.0	23.3	23.3	23.3	23.3	23.3	0.0	0.0	0.0	23.3
	EQ5100		רחחו	.ING TOWE	· D									, .
g À	WATER	0	0	.1110 1011	0	57	91	149	101	55	0	0	0	454
ever pi	PK	0.0	0.0	0.0	0.0	0.4	0.7	0.9	0.8	0.6	0.0	0.0	0.0	0.9
1	EQ5001		CHTI	LED WATE	n dwild g	. V								
•	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010		CON	DENSER WA	YER PUMI	P.C.V.								
•	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8		29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5300		CONT	ROL PANE	L & INTE	ERLOCK								

Trane Air Conditioning Economics V 600 By: Trane Customer Direct Service Network PAGE 17  $\int_{\mathcal{A}} f(\mathbf{r}, \mathbf{r}) d\mathbf{r}$ EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1 COMBINED ECOS 1,070 0 0 0 220 220 200 230 200 0 0 ELEC 0 0 0.0 0.0 0.0 0.0 1.0 1.0 1.0 1.0 1.0 0.0 0.0 0.0 PΚ 1.0 2 EQ1000 PREVENTS COOLING ENERGY ELEC 0 0 0 0 0 0 0 0 0 0 0 0 0 0.0 PΚ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 EQ5001 CHILLED WATER PUMP C.V. ELEC 0 0 0 0 0 0 0 0 0 0 0 0 0 PΚ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 CONDENSER WATER PUMP C.V. 2 EQ5010 ELEC 0 0 0 0 - 0 0 0 0 0 0 0 0 0 PΚ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 E04003 FC CENTRIF. FAN C.V. 9754 ELEC 8825 10683 9290 10219 10219 9290 10683 9290 10219 9290 9290 117,051 PK 46.4 46.4 46.4 46.4 46.4 46.4 46.4 46.4 46.4 46.4 46.4 46.4 46.4 1 EQ4003 FC CENTRIF. FAN C.V. 2276 2384 27,312 ELEC 2059 2493 2168 2384 2384 2168 2493 2168 2168 2168 ρĶ 10.8 10.8 10.8 10.8 10.8 10.8 10.8 10.8 10.8 10.8 10.8 10.8 10.8 2 EQ4003 FC CENTRIF. FAN C.V. ELEC 0 0 0 0 0 0 0 0 0 0 0 0 0 0.0 ρĶ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 3 EQ4003 FC CENTRIF. FAN C.V. ELEC 13975 12644 15305 13309 14640 14640 13309 15305 13309 14640 13309 13309 167,695 PΚ 66.5 66.5 66.5 66.5 66.5 66.5 66.5 66.5 66.5 66.5 66.5 66.5 66.5 EQ4003 FC CENTRIF. FAN C.V. ELEC 1747 1580 1913 1664 1830 1830 1664 1913 1664 1830 1664 1664 20,962 PK 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 5 EQ4003 FC CENTRIF. FAN C.V. ELEC 20030 18122 21937 21937 19076 20983 19076 19076 19076 20983 20983 19076 240,355 PK 95.4 95.4 -95.4 95.4 95.4 95.4 95.4 95.4 95.4 95.4 95.4 95.4 95.4 5 EQ4003 FC CENTRIF, FAN C.V. ELEC 2504 2384 2623 2384 2265 2742 2384 2623 2623 2384 2742 2384 30,044 11.9 PK 11.9 11.9 11.9 11.9 11.9 11.9 11.9 11.9 11.9 11.9 11.9 11.9 EQ4003 FC CENTRIF. FAN C.V. ELEC 20030 21937 19076 21937 19076 20983 18122 20983 20983 19076 19076 19076 240,355 PΚ 95.4 95.4 95.4 95.4 95.4 95.4 95.4 95.4 95.4 95.4 95.4 95.4 95.4 6 EQ4003 FC CENTRIF. FAN C.V. 2504 2265 2742 2384 2623 2623 2384 2742 2384 ELEC 2623 2384 2384 30.044 11.9 11.9 11.9 11.9 11.9 11.9 11.9 11.9 11.9 11.9 PΚ 11.9 11.9 11.9 PURCHASED DISTRICT STEAM 1 EQ2101 1784 1667 485 C 0 0 0 0 306 846 1681 8.696 P STEAM 1927 0.0 0.0 PΚ 9.4 9.4 9.4 7.4 0.0 0.0 0.0 6.9 9.0 9.4 9.4 HEAT WATER CIRC. PUMP C.V. 1 EQ5020

## - EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1 COMBINED ECOS

	ELEC	6264	5667	6860	2983	0	0	0	0	0	2565	4534	5966	34,839
-	ÞK	29.8	29.8	29.8	29.8	0.0	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8
i	EQ5061		COND	ENSATE R	ETURN PU	мp								
_	ELEC	117	106	128	56	0	0	0	0	0	48	85	112	652
	PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
2	EQ2101		PURC	HASED DI	STRICT S	TEAM								
	P STEAM	9319	8627	8058	2358	0	0	0	0	0	1516	4121	8127	42,125
	PK	45.5	45.5	45.5	35.8	0.0	0.0	0.0	0.0	0.0	33.4	43.4	45.5	45.5
2	E05020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	5220	4723	5717	2983	- 0	0	0	0	0	2560	4574	4971	30,748
	PK - PA	24.9	24.9	24.9	24.9	0.0	0.0	0.0	0.0	0.0	24.9	24.9	24.9	24.9
2	EQ5061		COND	ENSATE R	ETURN PU	<b>1</b> P								
	ELEC	26	23	28	15	0	0	0	0	0	13	23	25	152
	PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
3	EQ2000		PREV	ENT SUM	OF HEAT	ENERGY								
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ5020		HEAT	WATER C	IRC. PUM	P C.V.								
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### UTILITY PEAK CHECKSUMS - ALTERNATIVE 1 COMBINED ECOS

----- UTILITY PEAK CHECKSUMS

873.7 100.00

Utility	ELECTRIC	DEMAND
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Peak Value 873.7 (kW) Yearly Time of Peak 14 (hr) 7 (mo

#### Hour 14 Month 7

Grand Total

Hour 14 Month 7				
Eqp. Ref. Equipment Num. Code Name Cooling Equipment	Equipment Description	Utility Demand (kW)		
1 EQ1001S	2-STG CTV <555 TONS	261.7	29.95	
Sub Total		261.7	29.95	
Sub Total		0.0	0.00	
Air Moving Equipment				
1 3 5 6 Sub Total	SUMMATION OF FAN ELECTRICAL DEMAND SUMMATION OF FAN ELECTRICAL DEMAND SUMMATION OF FAN ELECTRICAL DEMAND SUMMATION OF FAN ELECTRICAL DEMAND		12.28	
Sub Total Miscellaneous	- ·	0.0	0.00	
Lights Base Utilities Misc Equipment Sub Total		265.3 0.0 0.0 265.3	0.00	